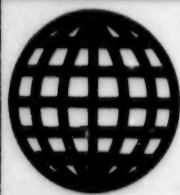


JPRS-TEN-94-011  
29 April 1994



**FOREIGN  
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# ***JPRS Report***

# **Environmental Issues**

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# Environmental Issues

JPRS-TEN-94-011

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29 April 1994

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### **Liaoning Launches Campaign To Protect Environment**

OW1304112994 Beijing XINHUA in English  
0824 GMT 13 Apr 94

[Text] Shenyang, April 13 (XINHUA)—Northeast China's Liaoning Province is launching an environmental protection campaign to increase its residents' awareness of pollution problems.

The province, one of the major heavy industrial centers in China, has been plagued by industrial pollution for a long time. Shenyang, capital of the province, and Anshan, a steel city, and other large and medium-sized cities were once pollution-ridden and are now still facing serious problems of pollution.

To reduce pollution and better protect the environment, the province is now taking every possible measure to make its residents aware of pollution problems.

Children in schools all over the province are given books on environmental protection which explain in simple and clear language the relationship between nature and human beings, and between environmental pollution and disease.

Two special primary schools have been established, where students are examined on the subject of environmental protection as well as other subjects.

Government officials are also required to stay abreast of problems of pollution. They are given lectures on the basics of environmental protection and its relationship with economic development.

Factories are now paying attention to environmental protection as well as to safety in the workplace. Newspapers give prominent space and radio and TV use prime time to cover stories on environmental protection.

The chief of the provincial bureau of environmental protection has even hosted radio phone-in programs on environmental protection.

### **Regulations Issued on Import, Export of Toxic Materials**

HK1504074094 Beijing CHINA DAILY in English  
15 Apr 94 p 1

[Report by Zhu Baoxia: "Chemical Registration To Stop Deal in Toxins"]

[Text] Chemical traders will have to get environmental clearance beginning next month before their goods can be imported or exported, an attempt to combat shipments of toxic materials.

The National Environmental Protection Agency (NEPA) must check all chemicals exiting or entering the country, a switch from the old system that only required inspection from the Customs General Administration. NEPA, along with Customs and the Ministry of Foreign Trade

and Economic Co-operation (Moftec) issued the regulations yesterday. It takes effect on May 1.

The regulations were drafted in response to a UN call to stamp out unauthorized transfers of toxic chemicals worldwide.

And they are also aimed at protecting the national environment and the people's health, said Li Hengyuan, deputy division chief in charge of solid wastes and chemicals in NEPA.

Li said that chemicals play a key role in economic development and improving people's living standards, but some cause pollution and major health problems.

The World Health Organization (WHO) reported that about 60 to 90 percent of the known cancer cases are caused by chemicals.

Li said China has experienced rapid development in chemical production over the past few years which are widely applied in many fields. Add to this a large number of pesticides imported for agricultural production.

Customs in Shanghai and Guangzhou alone saw imports of 6 billion yuan (about \$700 million) in chemicals in 1993.

Nepa has received numerous reports of chemical accidents in recent years, Li said.

### **Airline Plays Role in Afforesting Inner Mongolia**

OW1604072894 Beijing XINHUA in English  
0640 GMT 16 Apr 94

[Text] Hohhot, April 16 (XINHUA)—The Inner Mongolia branch of China International Airlines has grown trees by way of aerial seeding on more than 700,000 ha of land in north China over the past more than a decade years.

North China has vast arid or semi-arid areas, with scarce vegetation and serious desertification. Forest cover in north China is lower than 10 percent. The development of the local economy has thus been seriously hampered.

Beginning in the late 1970's, the company was assigned to shoulder the task of planting trees in north China through aerial seeding.

As a result, the ecological environment, and production and living conditions of farmers and herdsmen in those areas selected for aerial seeding have shown marked improvement thanks to painstaking efforts in the past decade, local officials told XINHUA.

**XINHUA Commentator on 'Agenda 21' for UN Environment Plan***OW1604133394 Beijing XINHUA Domestic Service in Chinese 1330 GMT 15 Apr 94***[XINHUA Commentator: "A Grand Blueprint for China's Sustained Development"]**

[Text] Beijing, 15 Apr (XINHUA)—The State Council recently approved "China's Agenda 21," representing a practical step that China has taken to implement the resolutions of the United Nations Conference on the Environment and Development and a major event in China's efforts toward sustainable development. In a sense, the "Agenda" sketches for China a blueprint for development in the 21st century.

China is a developing nation with nearly a 1.2 billion population. China's foremost goal and task at present is to develop the economy and shake off poverty and backwardness. Like many developing countries, China faces global environmental problems such as climatic changes, ozone layer depletion, and reduced species diversity. In developing the economy, it also needs to address the problem of environmental pollution, ecological destruction, and devastation of natural resources. Due to low productivity levels, in the past China opted for economic development on a grand scale, seeking to realize high levels of growth through massive investment in industries with high levels of energy consumption and pollution. This led to the depletion of natural resources, the worsening of environmental pollution, and ecological destruction. As China's economy has now entered a stage of high-speed development, greater pressure will surely be brought to bear on our natural resources and environment if we continue to stick to an outdated development pattern and only emphasize quantitative growth to the neglect of qualitative improvements to the economy. If we fail to change our direction, we will be forced to pay a greater price; China's modernization process will be delayed; and the foundation of the existence and development of the Chinese nation will even be undermined.

Sustainable development is a great cause that has not yet been taken up in the course of human history.

Sustainable development in China is an important component of global sustainable development. The only way for China to ensure sustainable and high-speed development is to opt for a development path that will not only promote the economy but also protect the environment. The idea behind the formulation of "China's Agenda 21" is to promote sustainable development in China.

For human beings at the close of this century and the next, the issues of population, natural resources, and the environment will be common themes. As a developing country, China is entrusted with an important mission. The scope of the rational use of resources and environmental protection is no longer limited to the prevention of environmental pollution and to the restoration of the

ecological system, but is being extended to a greater range of economic development and social progress. This marks a great leap in the cognitive level of human beings. It is precisely because of such a cognitive leap that we are presented with a new opportunity for development. It is necessary to realize high economic efficiency and to conserve natural resources and to lower energy consumption through setting a rational industrial setup, standardizing the types and scales of industrial enterprises, formulating and implementing correct industrial policies, accelerating the pace of readjusting industrial structure and technological transformation, and popularizing non-polluting production technologies and adopting non-polluting production methods. It is also necessary to continue experimenting with ecological farming projects; to greatly popularize non-polluting technologies for farming production; to rationally develop, utilize, and protect farmland; to enhance the capability to combat natural disasters; to gradually build an intensive-farming industry; and to help establish a rational structure for city planning.

The birth of "China's Agenda 21" marks a good beginning for China's sustainable development. Now, the most important task for us is to advance the comprehensive implementation of "China's Agenda 21" in a down-to-earth manner.

The Chinese people have made tremendous contributions to human civilization. The Chinese people, by adhering to the policy of reform and opening up, are now advancing step by step along the path of sustainable development. We will surely have a bright future. China will surely make new contributions to the global environment and development.

**New Stamps Feature Desert Afforestation***OW1704072894 Beijing XINHUA in English 0653 GMT 17 Apr 94*

[Text] Beijing, April 17 (XINHUA)—The Chinese Ministry of Posts and Telecommunications is to issue, on April 21, a set of four stamps featuring desert afforestation.

Designs and denomination of these stamps are: "the vast expanse of desert", 15 fen; "flowers in the desert", 20 fen; "forest of diversiform-leaved poplar", 40 fen; and "oasis in the desert", 50 fen.

Desertification is a serious environmental problem challenging the whole globe. China has vast areas of desert and is seriously affected by desertification. At present deserts constitute 15.9 percent of China's land area.

In recent years China has achieved notable results in harnessing desertification, with drought-enduring shrubs and trees, such as the diversiform-leaved poplar, planted to shelter farmland and stop moving dunes.



So far, some 6.7 million hectares of the country's deserts have been afforested, and 10 percent of the desertified land has been effectively harnessed.

The designer of the stamps is Meng Sihui from the Palace Museum.

#### **Geologists: Tibetan Plateau Movement Affects Global Climate**

OW1704131094 Beijing XINHUA in English  
1224 GMT 17 Apr 94

[Text] Lanzhou, April 17 (XINHUA)—Chinese geologists believe that the bulging movement of the Qinghai-Tibet Plateau affects the the global climate along with the formation of plateau monsoons.

Extensive investigations beginning last year on this highest plateau in the world by a team of Chinese scientists have shown that plateau monsoons have a strong influence on sand storm and precipitation distribution worldwide.

Before the formation of plateaus the global climate was mild and humid with little variation in different places, according to scientists at the Lanzhou Institute of Plateau Atmospheric Physics of the Chinese Academy of Sciences (CAS) in northwest China's Gansu Province.

In the tertiary period, the scientists said, the Qinghai-Tibet plateau began to rise. Consequently the global environment and climate started to change.

In other words, the swelling of the plateau led to the formation of hot low pressure in summer and cold high pressure in winter around the plateau, and plateau monsoons began to emerge.

The scientists estimated that the monsoon formation could be traced back as early as 37 million years ago, and it took its present form about one million years ago.

Such changes in atmospheric circulation in turn caused sharp temperature drops along the earth's medium and high latitudes, and the geological distribution of precipitation also began to take on monsoon traits. In summer, the land to the east of the plateau was humid while the land to the west was dry.

About 2.4 million years ago the plateau rose to 1,500 m above sea level on the average. Now the average elevation is 4,500 m.

The scientists said the intensification of circulating currents made the climate along the medium and high latitudes of the northern hemisphere turn cold, and glacial periods emerged.

Monsoons also strengthened the high-altitude subsidence airstream in the southwest of the plateau, which resulted in drought in northern Africa, with the original forest climate turning into a semi-arid climate. Man appeared at this time.

On the other hand, due to a strong wind belt two km over the land surface caused by the plateau monsoon, the yellow sand north of the plateau was stirred up and descended onto the northeast of the plateau to form a loess plateau covering 600,000 sq km over the years.

In addition, intensified sunlight reflected on the plateau surface after the swelling movement led to abnormal air circulation in the entire northern hemisphere. In turn, the middle and eastern part of the American continent became humid and its western part turned warm and dry.

With the aid of satellite data, scientists at the Lanzhou Institute of Desert Research found that widespread snowfall and glaciers due to the swelling affected the global climate, too.

They also discovered that the plateau monsoon accelerated the speed of wind in spring in the central Asian region, and large-scale sand storms emerged in desert areas and places short of vegetation, between February and May in particular.

Sand particles can be carried as far as the waters of the Northern Pacific Ocean and Northwest Indian Ocean.

#### **Serious Pollution, Residue Reported in Beijing Rivers**

HK1804041994 Hong Kong ZHONGGUO TONGXUN  
SHE in Chinese 1132 GMT 16 Apr 94

[Text] Beijing, 16 Apr (ZHONGGUO TONGXUN SHE)—In recent years river channels inside and outside Beijing have suffered from human-made destruction and serious pollution. Therefore, some experts have time and again warned relevant departments and citizens that because there is a serious shortage of water resources and pollution is getting worse, many river channels on the outskirts of Beijing have silted up.

The River and Lake Management Section of the Beijing Municipal Water Resources Bureau revealed that former Beijing Mayor Chen Xitong personally inspected the Erdao channel in Jintailu last year. This channel was called a "present-day dragon beard ditch" [meaning the channel was full of residue]. He immediately instructed the relevant department to improve the situation. In a week the dregs were cleared but the channel silted up again the following week. It was learned that the river water passing through this channel was for the Beijing No. 1 Thermal Power Station to generate electricity. The silt in the channel caused by pollution threatened the normal operation of the power station. Once the relevant department dredged up some tree branches, foam plastics, bicycles, three-wheeled carts, dead pigs, and dead dogs from a silted-up section of the channel.

Pollution similar to this is not rare in Beijing. Some experts said that apart from industrial pollution, the most threatening is human-made pollution. Most of the 175-km long river channels on the Beijing outskirts are

clean in the upper portions, green in the middle, and black in the lower reaches. Protecting water resources, which are seriously in short supply, has become an urgent task for Beijing.

### Government To Fine Enterprises for Polluting Environment

HK1804071494 Beijing CHINA DAILY in English  
18 Apr 94 p 1

[Report by Zhu Baoxia: "Nepa Reveals \$1.6m Pollution Fine Scheme"]

[Text] The National Environmental Protection Agency (Nepa) yesterday announced a \$1.6 million plan to improve China's pollution charges system.

The two-year project involves a pollution study and aims to work out new charges for offenders, said Lu Xinyuan, deputy director of Nepa's supervision and development department.

It is being financed by a \$1 million loan from the World Bank and 5 million yuan (\$600,000) from central and provincial governments.

All enterprises are to be taxed for emitting sulphur dioxide before the end of the year and they will have to pay for discharging solid waste next year.

Lu said the measures would help curb the spread of acid rain which is caused by sulphur dioxide.

Acid rain damages crops, forests and buildings and costs China an estimated 16 billion yuan (\$2 billion) a year.

It is currently spreading from Southwest to East China, the official said.

The country first adopted pollution charges in the late 70's.

And 30 provinces, autonomous regions and municipalities have levied charges on 113 pollutants.

More than 200,000 enterprises nationwide have paid a total of 18 billion yuan (\$2 billion) in the past 15 years.

Last year, they paid 2.7 billion yuan (\$310 million)—more than 10 times the figure in the late 70's.

The charges have been used to subsidize the control of key polluted areas.

And they have covered 6 per cent of the country's total spending on the control of industrial pollution.

Studies into the uses of pollution charges in 24 large and medium-sized cities showed 796 million yuan (\$139 million at the old exchange rate) had been levied on 3,901 enterprises in seven years.

This cash, plus government investment, funded the construction of more than 7,000 pollution-control

projects nationwide. They were designed to treat 794 million tons of waste water and 199.1 billion cubic metres of waste gas a year.

### China's Grassland Resources and Its Development Policy

94WN0192A Beijing ZHONGGUO HUANJING BAO  
in Chinese 9 Dec 93 p 3

[Article by Yang Ailian [2799 1947 5571]]

[Text] Grassland is one of China's six primary resources, totalling 6 billion mu in area (400 million hectares), amounting to 40 percent of the total area of the country. China's grasslands are not only extensive, but they are widespread, stretching from 310 to 610 longitude. China's grasslands are divided into 17 major types, over 30 subtypes, and over 1,000 specific varieties where more than 7,000 species of natural pasture grasses and feed plants grow. Within China's 21,000-kilometer borderline, 14,000 are on grasslands. Most of these grasslands are on the frontier in remote areas where diverse minority peoples live, and much of it ancient and poor.

The protection, practical utilization, and development of grassland resources are not only of strategic economic importance, but also of strategic importance for strengthening the solidarity of the people, turning poverty into riches, strengthening border defenses, administering the national territory, and protecting and improving the ecological environment.

1.113 billion mu of China's 6 billion mu of grasslands are southern mountain grasslands or grazing lands, and in the north there are 378 million mu of grasslands, more than half of which, on average, are not in use. About 400 million mu of grazing lands are arid or summertime pasturage not yet fully developed for use, and over 1 billion more are depleted grassland that need to be renewed to greatly raise their level of productivity. Although the utilization of China's grasslands is presently in a period of transition in the level of productivity and method of management and utilization, moving away from the natural grazing stage to one of intensified management, they are still largely being plundered by the old style of grazing. Grassland resources have not been used to their fullest advantage and have not yet reached full production potential, and their present level of production is very low. In 1989, livestock production per 100 mu of grassland was one-twentieth of that of the U.S., one-tenth that of Austria, and one-eightieth that of New Zealand.

The low productivity of China's grasslands does not arise from lack of actual natural resources, but from historical social and circumstantial causes, mainly:

1. Poor, unconstructive and backward management of grasslands for pasturage has caused grasslands to recede markedly. Grassland laws and protective controls are weak, and more than 100 million mu of grassland has been destroyed through exploitation in recent decades. Grassland management has for a long time been a



practice of "eating from the big pot", and the management, construction, and utilization rights, responsibilities and benefits have not been driven home to the people, and that's why there has been an increase in over-grazing. Grasslands have been simply used and not replenished for a long time, and for decades, for every yuan of annual output from every mu of grassland, only 2 or 3 fen have been re-invested. Being unable to make ends meet has led to predatory management and relentless disappearance of grasslands which have turned to sand and salt, causing the depletion of over 1 billion mu of grassland. Grass production is down to two-thirds or one-half of what it was in the 1950's, hastening the loss of grasslands and wetlands, and increasing the hazards of sandstorms and pestilence.

2. Although the water and temperature conditions of mountain grasslands and grazing areas in the south are good, traditional farming mentality hinders the advance of efficient grass and pasturing technology and methodologies, and progress has been made in only a few places, while in most areas resources are still being wasted. In many places grass on mountain slopes has been removed to plant cereal crops, causing loss of wetlands, ecological damage, and bringing poverty to the mountain and the people, or creating a situation comparable to going begging with a gold cup.

3. Damage caused by mixed farming and grazing of mountain grasslands and grazing areas in the north has been serious. Although conditions are good for grasses and excellent for mixed farming and grazing, the attitude of favoring farming over grazing, and using grasslands for cereal crops has been detrimental to the development of grasslands, such as on the Sanjiang plain, the loess plateau, and the Huanghai coastal grasslands where the land has been turned to sand and salt, the ecological environment has been damaged, and use of grassland resources has been counter-productive.

A national program for the development of grassland has been formulated to improve grasslands in order to meet the demand for wool, milk, beef and mutton, the needs for economic development of grassland areas and management of the national territory. A policy for a ten-year goal for grassland development has been formulated to integrate key-point development with overall administration, construction and management, and to make full use of the advantages in the north and south. Along with enforcement of national grassland laws and a compensatory contract responsibility system, and nationwide administration for development of vanishing grasslands, good grazing stock processing facilities should be built and commercial grazing stock product bases should be created in key development areas, in the northern mountain grassland and grazing locations, and in southern mountain grassland and grazing areas. Key projects should be implemented to build livestock feeding and shelter facilities on grasslands, meat and hides projects on northern grasslands, projects to emulate New Zealand on southern grasslands, green-light projects to control

the depletion of grasslands, and other capital construction projects in grassland areas.

The following development policies must be adopted to realize the above targets:

1. Put more effort into publicizing "grassland laws", enact better grassland laws and perfect the legal system as soon as possible, set up stronger enforcement organizations, raise the quality of law-enforcement units, resolve and eradicate grassland destruction, put a time limit on effecting property and utility rights, and credentials, put the compensatory responsibility system into full force, put teeth into grassland protection, ensure practical use and effective construction of grasslands.

2. Development and utilization of grassland resources should be brought into capital construction planning and financial business development plans to guarantee a steady input and supply of materials;

3. Nationally and locally financed grassland development foundation systems should be set up, mainly through financial outlays or land occupation and utilization taxes, grassland resource management fees, pasturage taxes, slaughterhouse taxes, part of which should be used for development of grassland resources. These foundations could be used for repayments, and managed by livestock (grassland) handling departments, and supervised and checked by financial departments;

4. Grassland resource administrative organizations should be strengthened. Among China's 6 major resources, grasslands occupy the largest area, but there is only one office-level (grassland office) unit with management responsibility, which, as the socialist market economy develops, will become unsuitable for handling the development and utilization of grassland resources. China must setup competent management organizations for effective macro-controls, supervision, and inspection of grassland resources.

#### Harmful Effects of Acid Rain Expanding

94WN0115A Beijing XIANDAIHUA  
[MODERNIZATION] in Chinese Vol 15 No 10,  
October 93 pp 7-8

[Article by Xu Shangxiang [5171 1424 3276]: "An Alarm: Harmful Effects of Acid Rain Expanding in China"]

[Excerpts] In recent years, the harmful effects of acid rain in China have been expanding. In 1992, the amount of sulfur dioxide emitted into the atmosphere surpassed 17 million tons, and surveys indicate that a quarter of the cities in northern China have atmospheric sulfur dioxide concentrations above the permissible level of 0.15 mg/m<sup>3</sup>. In southern China, the acidity of precipitation is increasing perceptibly, and the area subject to acid rain, which originally was confined to the Chongqing-Guiyang and Nanchang-Changsha regions, now



includes the Fuzhou-Xiamen, Changzhou-Shanghai-Hangzhou, and Qingdao-Jinan areas. The harmful effects of acid rain are now among the ten major environmental problems facing China's modernization.

1. **Destruction of Forests.** Before acid rain reaches the ground, it damages the leaves of trees, causing them to become yellow, gradually lessening their photosynthetic ability, leaching out nutrients, and causing the leaves to wither and fall. When acid rain enters the soil, it dissolves inorganic nutrients, leaches them away, and also decreases the amounts of organic matter in the soil, thus decreasing soil fertility. Acid rain also hinders root development, retards the growth of trees, and decreases their resistance to disease and insect pests, with the result that large areas of forest are killed. In the mid-1980's, precipitation in Sichuan had become significantly acid (in 1989 the pH of rain in Chongqing had fallen to 4.21), and acid rain was abundant in the Chengdu and Chongqing regions; as a result, the huashan pines at Fengjie, the firs of Mount Emei, and the masson pines in the hills south of Chongqing have been damaged over an area of more than 100,000 mu.

2. **Corrosion of Buildings and Structures.** Acid rain can react chemically with limestone, sandstone, concrete, and metals. The resulting corrosion damages or defaces buildings, statues, and cultural relics. It has been reported in the press that owing to the effects of acid rain the Leshan Buddha, the largest statue of the Buddha in the world, is already seriously affected: its face is pitted, its nose is blackened, its body is wasting away, material has been lost from the hands, feet and shoulders, and the outer garment is being worn away, making urgent measures necessary. High-voltage electric transmission lines, railways, metal bridges, motor vehicles and skyscrapers are being corroded by acid rain, which decreases their service life and necessitates more frequent repair. Surveys in Guangdong and Guangxi provinces found that the cost of rustproofing metal equipment such as that described above exceeds 100 million yuan.

In addition, acid rain causes corrosion or fading of paints and organic coatings, weakens fabrics and causes them to fade, ages rubber and plastic, and degrades and destroys paper products, thus decreasing or eliminating their utility value.

3. **Dying Lakes.** Although no acidification of lakes has yet been found in China, bicarbonate levels in some reservoirs of the Jiajiang, Danleng and Mingshan regions (covering about 5,000 square kilometers) have fallen to 0.5 meq/liter [milliequivalents per liter]; in the Zigong, Rongxian, Wanxian, Liangping, and Zhijiang regions (about 8,000 square kilometers), bicarbonate levels in some reservoirs are between 0.5 and 1.0 meq/liter. Under the international Gallway standard, water bodies with bicarbonate levels below 0.5 meq/liter are classified as sensitive to acidification; those with bicarbonate levels above 0.5 meq/liter are classified as not sensitive to acidification. Thus, the first group of reservoirs mentioned above is sensitive to acidification: owing to their

low bicarbonate levels, they have a weak buffer capacity for resisting acidification and a latent proneness to acidification. The latter group of reservoirs is potentially sensitive. Thus, the problem of acidification of lakes must not be ignored.

4. **Decreased Crop Yields.** When acid rain falls, the leaves of crops are the first to be damaged. Rusty spots appear on them and they turn yellow. Their absorptive ability and photosynthetic ability are weakened, and the internal organization of the leaves is damaged, resulted in the leaching out of sugars, amino acids, and pectin and retarding their growth. Acid rain also decreases the sprouting rate of seeds and the root development of plants; and because the absorptive ability of soils is decreased, seedling growth is slow and crop yields fall. On 15 March 1979, a fall of acid rain that occurred in a zone including the Fenghuang, Changsha and Xiangtan areas of Hunan Province and the Songtao region of Guizhou Province caused a major decline in crop yields over an area of 350 square kilometers.

Acid rain leaches such inorganic components as potassium, calcium and magnesium from the soil and can decompose rock, alter soil components, accelerate the leaching of potassium and magnesium and promote wind erosion of the soil; it can depress the vital activity of microorganisms, slow the degradation of organic matter, and cause a decline in soil fertility, which also decreases crop yields. According to Ministry of Agriculture statistics, 5.3 million hectares of agricultural land in China is affected by acid rain and fluorine pollution, and the annual loss of grain output exceeds 6.3 billion kilograms.

As the acidity of precipitation increases, toxic metals such as aluminum, mercury, cadmium and lead can be leached from rocks or the soil and can be absorbed by plants. Elevated cadmium levels have been found in plants of the lettuce family. Toxic metals in vegetables and fruits may not affect yields, but they do lower the food value of produce and may make it inedible.

#### **Status and Trends of Nitrous Oxide Emissions in China**

94WN0115B Beijing HUANJING KEXUE

[ENVIRONMENTAL SCIENCE] in Chinese Vol 14  
No 3, June 93 pp 42-45

[Article by Wang Shabin [3769 1421 1755] and Su Weihai [5685 4850 3466], Ecological and Environmental Research Center, CAS, Beijing: "Nitrous Oxide Emission Levels in China"; manuscript revised 24 Nov 1992]

[Excerpts] Abstract—The sources and magnitudes of nitrous oxide emissions in China are described and analyzed. The annual emission of nitrous oxide in China is 950 gigagrams (as nitrogen), equivalent to about 6 percent of the world total. Natural sources account for 71 percent of the total and human sources for 29 percent. The primary natural source is the sea, and the most

important human source is the combustion of coal. It is calculated that in the next few years the rate of increase of  $N_2O$  emissions will be 6 gigagrams per year (as nitrogen)

Nitrous oxide ( $N_2O$ ) is an important atmospheric trace gas which both contributes to the greenhouse effect and can destroy ozone in the stratosphere. Atmospheric  $N_2O$  levels have increased greatly from their pre-Industrial Revolution levels, reaching 310 ppbV in 1990, and the annual rate of increase is now between 0.2 and 0.3 percent. Although  $N_2O$  makes a major contribution to global environmental change, there are still difficulties in identifying and quantifying its sources. It was formerly believed that the use of agricultural fertilizers and the combustion of fossil fuels were the factors causing global  $N_2O$  levels to rise. But recent research has shown that the results of earlier calculations were overstated, and as a consequence, more detailed efforts to identify  $N_2O$  sources and to forecast  $N_2O$  concentrations are being made.

Because  $N_2O$  levels vary from region to region and from country to country, any limits imposed on its emission must take account of the particular conditions of each country. Calculated country-by-country or region-by-region emission figures are of great importance in the development of appropriate control policies in each country and are also of great reference value in calculating the global  $N_2O$  budget. Since China is a large, developing nation, the trace gases emitted by its industry and agriculture may constitute an important fraction of total global emissions of greenhouse gases. Wang Mingxing [3769-2494 2502] has made an estimate of methane emissions in China, but there have been relatively few efforts to determine the emission sources of other trace gases in China. In this paper, using domestic statistics and following the most recent OECD methodology for calculating trace gas emissions, we analyze domestic  $N_2O$  sources and their relative contributions.

Nitrous oxide emissions can be classified as natural and manmade. Among the natural sources, we shall concentrate on emissions from soil and water. Table 1 gives statistics on  $N_2O$  emissions in China, classified by source.

Table 1

### 3. Annual Change in $N_2O$ Emissions

Human activity has altered the global environment and is producing a great effect on atmospheric  $N_2O$  levels. Changes in the natural environment and the development of industry and agriculture have caused fluctuations in emissions by various  $N_2O$  sources. Below we shall present crude estimates of the changes in  $N_2O$  sources that are likely to result from various factors in the next few years (Table 2).

In China, housing construction, desertification and other land-use factors are causing a gradual decrease in the arable land area, which may cause a decrease in  $N_2O$

emissions from the soil. It is estimated that an annual decrease of 5 million  $hm^2$  in the area of arable land and grassland will result in an annual decrease of 3.0 Gg (gigagrams) in  $N_2O$  [here and below, all figures for nitrous oxide are expressed as nitrogen]. But with accelerated economic development, the consumption of fossil fuels will rise steadily, producing an increase in  $N_2O$  emissions. The combustion of coal, oil and natural gas in stationary facilities will cause increases of respectively 2.8, 0.3, and 0.03 Gg of  $N_2O$  per year, for a total of 3.1 Gg. Similarly, the total  $N_2O$  emissions from mobile sources will increase by 0.3 Gg. An annual increase of  $1.4 \times 10^8$  kg in fertilizer use will cause direct release of 1.6 Gg  $N_2O$  from the soil, together with the emission of 1.6 Gg of  $N_2O$  from groundwaters. The burning of straw from crops will produce an annual increase of 2.3 Gg  $N_2O$  per year, but this is an upper limit: because the energy structure of agriculture is changing and fossil fuels are gradually replacing plant fuels as an energy source, in the next few years  $N_2O$  emissions should increase by about 6 Gg.

Table 2.

4. Conclusions. Our analysis indicates that the total amount of  $N_2O$  emitted in China is 950 Gg per year (as nitrogen), with natural and manmade sources accounting for respectively 71 and 29 percent of the total. It is reported that the total world emission of  $N_2O$  is 14 to 15 Tg (teragrams). Thus, China's  $N_2O$  emissions account for about 6 percent of the world total. The calculations show that China's  $N_2O$  emissions are primarily from natural sources, chiefly marine sources. Because China burns very large amounts of coal, this source represents a rather large fraction of manmade  $N_2O$  emissions. Owing to changes in various factors, in the next few years the net annual increase in  $N_2O$  emissions will be 6 Gg  $N_2O$ .

### Ecological, Environmental Situation in Northwestern China Studied

94WN0120A Lanzhou KEXUE JINGJI SHEHUI  
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[Article by Peng Keshan [1756 3784 3790], Northwest China Soil and Water Conservation Institute, CAS: "Ecological and Environmental Disasters During the Economic Development of Northwest China and Strengthened Measures to Deal with Them"]

[Text] Northwest China comprises Shaanxi, Gansu, Ningxia, Qinghai and Xinjiang provinces. Its total area of 3.03 million square kilometers represents 31.6 percent of the country's land area, and its 11 million hectares of arable land represents 12 percent of the national total. Its population is 74.92 million, 7 percent of the country's total, and includes an agricultural population of 58.75 million, 6.8 percent of the country's total. The amount of wasteland that could easily be brought under cultivation is roughly equivalent to the current area of cultivated



land. Northwest China is the main pasturing and livestock-raising area of China, with 110 million ha of usable grassland, constituting 33 percent of the country's total; it also has 14 million ha of forest land, or 11.9 percent of the national total. Although the area has vast land resources, hard-to-use deserts and barren hills now represent 50 percent of its total area. The region contains an important part of China's supplies of coal, petroleum, natural gas, rock salt, and nonferrous metals. With the rapid development of the national economy, various types of irrational human activities will intensify, and ecological and environmental disasters will grow increasingly serious, causing harm to the economy.

### I. Principal Aspects of Environmental Disasters in Northwest China

Some aspects of environmental disasters in Northwest China are a historical legacy, while others are the result of human-caused damage to the ecology and environment. As people have come to take ecological development more seriously, and as environmental awareness has increased, environmental development in the northwest has made some progress. But the problem of ecological and environmental damage has not been brought thoroughly under control, and eco-environmental disasters are becoming increasingly serious. They have become the limiting factor on economic growth and they threaten the conditions of life: thus they have reached the alarm stage. The principal types of ecological disasters are as follows.

#### A. Serious Damage to Vegetation

1. **Damage to Forests and a Decrease in the Forested Area**—Damage to forests is the principal culprit in creating an ecological and environmental imbalance. The region has a harvestable forested area of 13.7 million ha, or 11.9 percent of the country's total forested area of 115.2 million ha. But the high elevations in the area and its cold, dry climate, with scarce precipitation, combined with human-caused damage to the region's ecology and environment, result in a very slow forest growth rate. The world average rate of forest cover is 22 percent and China's national average is 12.7 percent. But as a result of serious forest damage, Northwest China's percentage of forest cover is only 3.28 percent, one of the lowest figures for any region of the world.

2. **Excessive Cultivation of Grasslands**—The Northwest is China's main livestock raising area. Xinjiang, Qinghai and Gansu are three of the country's five major pastoral areas. Northwest China has a total of 1.133 billion ha of grassland. The currently usable natural grass areas total 106 million ha or 33 percent of the national total. But most of the grasslands in the Northwest are arid prairie, desert prairie, or alpine grasslands; these areas do not have the lush appearance described in the old poem, "When the grass bends before the wind, you can see the cattle and sheep." The majority of the grass area is shortgrass prairie with a very low grass production rate. In addition, there has been serious human

interference. Since liberation, a total of 3.4 million ha of grassland has been brought under cultivation in Xinjiang Province. For the most part, this was fertile, well watered land, and much of it served as winter and spring grazing land for livestock. When it was brought under cultivation, the livestock was displaced to poorer, more arid grasslands, and the change in land use and inadequate development measures resulted in a significant amount of desertification. A sharp decline in the area of grassland caused the grass production of Gansu and Qinghai to decrease by 20 to 40 percent. In the mid-1980's, the economic loss resulting from damage to the grasslands of northwestern China was 2.0 billion yuan in Xinjiang, 1.4 billion yuan in Qinghai, 900 million yuan in Shaanxi, and 200 million yuan each in Gansu and Qinghai (all in constant 1989 yuan). The condition of the ecological environment, with its damaged vegetation, continues to deteriorate.

#### B. Deterioration of Soil Quality

1. **Intensified Erosion**—Erosion is one of the most troublesome aspects of damage to Northwest China's ecological system and is seriously affecting agricultural and livestock production and posing an increasing threat to human productive activity and to the conditions of life. Land areas suffering from erosion in the region already total more than 330,000 square kilometers. Just in Shaanxi and Gansu, the annual loss of nitrogen, phosphorus and potassium as a result of soil erosion is equivalent to more than 10 million tons of fertilizer, and 1.358 billion tons of silt is carried annually into the Yellow River from these provinces, representing more than 84 of the total amount entering the entire river. The cumulative amount of silt in the lower course of the Yellow River is 400 million tons, 50 percent of which comes Shaanxi. Soil loss by erosion in Shaanxi Province exceeds 10,000 tons per square kilometer, and the area subject to catastrophic soil erosion is 44,000 square kilometers or 21.4 of the total area of the province. Of the 192 reservoirs built prior to 1973, 41 (21.3 percent) are now fully silted up, and 40 percent of the effective volume of the remaining reservoirs has also been lost as a result of silting.

2. **Spreading Desertification**—Northwest China has 149 [as published; error for 1.49 million?] square kilometers of desert and gobi, or 15.5 percent of the nation's total. It is an arid or semiarid region, with precipitation of only 50 to 600 mm per year. These circumstances, combined with human-caused damage, are causing increasingly serious desertification. The area converted to desert is steadily expanding and already amounts to 23.80 million ha, in addition to which about 3.933 million ha of farm land, 4.933 million ha of grassland, and 2,000 kilometers of railway right-of-way are under the threat of desertification. The region east of the Helanshan and Wushaoling areas, and the mixed agricultural and pastoral region that extends from the Ordos to Ningxia, are in especially serious condition. Spreading desertification in Northwest China poses a great threat

to hydroelectric plant construction and railway construction and is affecting the economic development of the Northwest.

3. Expanding Salinization—The Northwest is the region of China with the most serious salinization problem. In a large part of the affected area, the plow layer of the soil has accumulated large amounts of salts; the salt content is sometimes 30 percent or more, producing large areas of salinized wasteland and converting the region to one of abundant halophilic vegetation. The area of salinized land exceeds 1.6 million ha. Of this total, 1.22 million ha is in Xinjiang, accounting for 30 percent of its total area of arable land. Since the filling of the Baojixia and Fengjiashan reservoirs in Shaanxi was begun in 1971 and 1977, the groundwater level has been rising steadily, and in Fufeng County alone, 0.53 [as published; error for 5,300?] ha of arable land has become salinized, with an average grain yield of less than 1500 kg/ha.

### C. Frequent Natural Calamities

As a result of ecological degradation, natural disasters have become more serious. The principal such disasters in the northwest are drought, hail, high winds, flooding, landslides, and mud and rock flows. The frequency of drought is increasing: a minor drought occurs an average of once in 3 years, and a major drought once in 7 years. The area of farmland in Shaanxi subject to drought increased from 182,000 ha in 1952 to 2.311 million ha in 1990, representing 65.26 percent of the total area of arable land. In addition, the annual precipitation is largely concentrated between July and September, and as a result, torrential rains may cause flooding in mountain regions, along with landslides and rock and mud flows.

### D. Serious Shortage of Water Resources

Northwest China is the country's main arid and semiarid region. It has little precipitation, and the amount of rainfall varies greatly through the year. The bulk of the area has less than 400 mm of precipitation a year, and 3/4 of that area has less than 250 mm per year. Surface water consists primarily of river systems, which are dependent on replenishment from glaciers and snowpack. Groundwater supplies are also not abundant, and only a few regions can practice irrigation. In most of western Qinghai, the annual precipitation is only 25 to 50 mm, and the precipitation in Toksun, Xinjiang, is only 3.9 mm per year, the country's lowest figure. The loess plateau belt that extends across Shaanxi, Gansu, Ningxia and Qinghai has very little surface water or groundwater, and in addition the terrain is complex and hard to use; as a result, irrigation water, drinking water, and industrial water are in extremely short supply. Although surface water is relatively abundant in most of the Qinqin region, the area lacks high-quality level land, so that there is little potential for irrigated agriculture. These circumstances, in combination with human impact, the lack of scientific awareness, and ill-considered mass-scale projects, are producing numerous problems in the

use of water resources. Chief among them are: (1) Inefficient use of water on the upper and middle sections of rivers, including excessive irrigation in the upper sections, which causes a lack of water in the lower sections of the rivers and produces desertification. On the upper Tarim River, the diversion of water for agricultural uses increased, and the water was indiscriminately dammed and withdrawn in the industrial areas of the middle section of the river, resulting in an acute water shortage in the lower reaches of the river and making it impossible to bring new areas under cultivation. (2) Owing to inadequate protection of the water quality of lakes, some of the freshwater lakes in the region have received large discharges of clean but saline water, causing a decline in water quality. Because no thought was given to protecting the waters of Bosten Lake when the Jiefang No 1 Canal and the Baolansu Dam were built, the amount of fresh water entering the lake is steadily decreasing, with an attendant increase in the proportion of high-salinity discharge waters entering the lake. As a result, the salinity of the lake's water rose from 0.38 g/liter in 1959 to 1.98 g/liter in 1992.

### E. Uncontrolled Waste Disposal

Environmental pollution is becoming increasingly serious as a result of the irrational disposition of high-energy-consumption local industry and other types of local industry and small-town enterprises. The "three synchronizations" (of programs, design, and construction) were rather poorly carried out, and the discharges of solid residue and of liquid and gaseous wastes were rather large. In addition little of the waste was treated. As a consequence, the environmental condition of Northwest China has been worsening, and pollution levels in some regions are far higher than those in coastal regions or developed regions. 1. Solid Residue. Northwest China is the country's largest energy base, and during the extraction process, mining enterprises usually consider only their own immediate benefits, indiscriminately piling up or dumping tailings or waste rock. Shaanxi produces about 14 tons of mineral tailings and solid waste from coal pits, chemical engineering plants and mining and metallurgy enterprises a year. While 8 percent of this waste is utilized, most of the rest enters rivers and streams. 2. Wastewater. On the Yinchuan Plain in Ningxia, where there is a sizeable concentration of industry and industrial wastewater is used to irrigate farmland, it was found that of 39 samples of wheat, 41.0 percent were contaminated with the harmful metals lead and cadmium and 10.3 percent were contaminated with arsenic; of 29 samples of paddy rice, 44.8 percent were polluted with lead, 41.4 with cadmium, and 6.9 percent with mercury. Nitrate pollution of such crops as chives, turnips, cabbage, rape, celery, spinach and radishes have reached levels that are cause for alarm. Some 24 percent of a group of soil samples had levels of cadmium pollution that exceeded the standards. The Yellow River too is polluted to various degrees. The main pollutants are: suspended matter, above the standard in 100 percent of samples; COD [chemical oxygen demand], above

standard in 83.33 of samples; phenols, above standard in 40 percent of samples; arsenic, above standard in 55.5 percent of samples; mercury, above standard in 11 percent of samples; and hexavalent chromium, above standard in 5.56 percent of samples. 3. Waste Gases. The principal waste gases are flue gas from the combustion of coal and such harmful gases as sulfur dioxide, which can form acid rain and can damage or kill forests and crops. The frequency, extent and severity of acid rain are increasing in Shaanxi Province. The frequency of acid rain in Shangzhou, southern Shaanxi, has reached 52.3 to 80 percent, and even Xifeng Peak, 2000 m above sea level in the Huashan range, receives acid rain.

## II. The Human Factor in Ecological and Environmental Disasters

Protecting the ecology and environment is equivalent to protecting the conditions of life for mankind and for all vegetation. But the condition of the environment is still deteriorating in the Northwest. Natural disasters are increasing, torrential rains are more frequent in summer, and winter droughts are more serious; forests are being logged excessively, the country's land resources are shrinking, indiscriminate cutting and overcutting cannot be controlled. Soil erosion is serious, producing a range of damage that exceeds control capabilities. Scientific and technological capabilities are weak, and new technologies and conventional technologies are difficult to disseminate. Environmental pollution by large industries is increasing steadily, and the harm done by pollution accidents is mounting, with the threat becoming steadily more serious. The rapid rise of low-level industry, with primitive equipment, outmoded processes, and inadequate management, combined with a lack of environmental protection awareness, has caused increasing pollution. When chemical fertilizers, agricultural pesticides, and plastic sheeting are used, they produce new and increasingly severe pollution.

The fact that the ecological system is made to produce high output while receiving low inputs is the primary factor responsible for damage to the eco-environmental balance. For many years, China's average investment in production industries that consume biological resources has been small, based on the belief that these renewable resources are inexhaustible. But the cumulative result over a long period has given rise to many human-caused ecological and environmental disasters. In forest management, the emphasis has been on logging, with a neglect of afforestation, and there has been overcutting of forest. More has been taken out than has been put in, and the practice of indiscriminate clear-cutting has left barren areas of wasteland and has damaged an increasing amount of the country's territory. In livestock grazing, the visible investment in building up and transforming grasslands has been insufficient. Their annual output value per hectare is an average of 15 to 23 yuan, but the annual investment per hectare is only 0.3 to 0.45 yuan. The great imbalance between inputs and outputs that results from insufficient investment is a growing trend.

In construction projects, there have been some rudimentary programs aimed at producing a beneficial ecological and environmental cycle, but they have generally been short-sighted, non-specific, unscientific, and infeasible. Many such programs have lacked any thorough systems-oriented preliminary studies that would have allowed the best program for integrated development to be chosen. As a result, in macroscopic terms, control was inadequate, and in microscopic terms there was a lack of specific detail. The result was that in the placement of municipal and rural construction and of industrial and agricultural production, and in the layout of the transport network, each project was usually a law unto itself. There was no careful, integrated provision for both the present and the long term, the particular and the general, the river basin and the local area, the main stream and side channels, the cities and the countryside. Administratively, there was no attempt at comprehensive consideration of mountains, waters, farmland, forest and roads; efforts to manage large and small river basins were not coordinated with each other; and it was very difficult to carry on integrated administrative measures. Ecological and environmental management was frequently plagued by lax observance of laws, failure to follow regulations, and inadequate management.

## III. Stepped-Up Measures Against Environmental Disasters

We should step up integrated research and protective activities in order to deal with ecological and environmental disasters and to develop and utilize China's land resources rationally. We should readjust the structure of industrial and agricultural production and strengthen our ability to guard against ecological and environmental disasters. An ecological viewpoint should be used to guide disaster prevention measures, to decrease losses from eco-environmental disasters, and to increase the effectiveness of efforts to ward off such disasters. The following stepped-up measures should be taken.

### A. Strengthen Environmental management, Improve Disaster Reduction Capabilities

1. Stepped-up Research, Integrated Preventive and Management Measures—Stepped-up research on ecological and environmental disasters is a major task of the science of natural disasters in the 1990's. Environmental disasters constitute a global system of deterioration, which is made up of disaster-breeding environments, disaster-promoting factors, disaster-prone entities, and the disaster-causing events themselves. The social application of research into disasters should consist of efforts to lessen them. Thus, emphasis should be laid on the following theoretical subjects. (a) Investigation of eco-environmental disaster chains: while specialized research is important, integrated research is even more important. (b) Investigation of clusters of eco-environmental disasters: they occur in clusters both spatially and temporally, and an integrated investigation of this subject is also necessary. (c) Investigation of the mechanisms of ecological and environmental disasters:



these include both disaster-causing mechanisms and disaster-promoting mechanisms, and environmental research dealing with regional eco-environmental disaster systems should emphasize their integrated mechanisms. (d) Research on regional disaster categories: disaster-prevention measures should be drafted on a scientific basis and should be geared to the disaster conditions of particular regions. (e) Research on eco-environmental disaster warning systems, with the purpose of giving timely predictions of disasters and minimizing the losses that they cause. (f) Major scientific investments in the prevention and management of eco-environmental disasters, and organization of a set of disaster evaluation systems, and of system science and system technology structures, uniting all three so that they work together to enhance research on eco-environmental disasters.

**2. Raise Awareness, Treat the Land as Precious—**Protecting the land is an effective means of mitigating eco-environmental disasters. But the land resources of the Northwest have been damaged repeatedly by such factors as erosion, indiscriminate use of agricultural land, recultivation of waste lands, and cutting of forests, and policies that leave the land idle; the result has been a sharp decrease in the amount of arable land. The world per-capita area of arable land is 0.37 ha. The figure for Northwest China is 0.152 ha, but in view of the rapid population growth, inducing all peoples in the region to value the land highly is a top-priority matter. Some provinces or regions in northwestern China have declared "land alarm days," on which organizations at all levels include long-term tasks of carrying out the Land Law, the Water and Soil Conservation Law, the Forest Law, the Grasslands Law and the Water Law on the agendas of party committees and governmental bodies and in addition take steps to increase the land awareness of all cadres and of the masses. Along with mass publicity in all forms, plans should be made to hold basic information and training classes on national land resources. Focal-point training classes should be held for rural and village cadres in order to make them thoroughly aware of the essential fact that China has a large population and limited land resources and that China's reserve land resources are inadequate.

**3. Focus on Propaganda, with Education as the Foundation—**Bringing about a beneficial ecological and environmental cycle is an immense systems undertaking and a basic means of mitigating eco-environmental disasters. We must rely on the combined efforts of the entire populace, propagandize and educate them, and use a variety of methods to increase awareness. The following steps should be taken. (a) Increase the ecology-mindedness of cadres at all levels and of the peasants, make use of oral presentations, pictorial propaganda, typical examples, visual education and the like to disseminate ecological information and to strengthen an environmental-protection orientation. (b) Hold classes on the integrated utilization of the ecological environment in institutions of higher education, make use of

adult-education examinations, offer two-year specialized courses, and train a contingent of advanced research and management personnel. (c) Use workplace training, radio and television educational programs, agricultural correspondence colleges and peasant night schools to train a home-grown contingent of technical personnel. (d) Strengthen ecological and environmental research. (e) Set up an ecological and environmental monitoring network and increase its density, and gradually convert people from indiscriminate measures and passive adaptation to conscious adoption of protective measures and conscious reform.

In the development of the socialist market economy, we must deal effectively with numerous contradictions between economic development and the environment. We must guarantee the resource requirements for state construction, suitably develop the area's resources, and engage in optimal planning, scientific management, and coordination. If environmental protection lacks correct guidance, or if comprehensive management of industry programs, siting programs, product-oriented programs, environmental protection programs and basic construction are ignored, it is likely that the result will be significant damage to the ecology and environment. If so, then the numerous dispersed rural enterprises will become the chief rural polluters and will cause large-scale pollution. Therefore, the development of rural enterprises must promote improvement of the environment and protect the natural ecological balance. This will produce great social and economic benefits.

#### **B. Protect the Environment and Promote a Beneficial Cycle**

**1. Afforestation and Intensification Activities—**In 1978, the state undertook the "Three Northern" protective forest program, whose objective was to bring about beneficial ecological and environmental cycles. By the year 2050, over an area of 4.069 million square kilometers in 14 provinces, regions, and municipalities, representing 42.4 percent of the country's area, a total of 0.251 [as published; error for 25.1 million?] hectares of plantings will have been created, along with 275 [as published] ha of forest growth in closed mountain areas, which will essentially control erosion in the area covered by the project. Implementation of the program and the relevant construction activities are in full swing. Afforestation must be carried out in a manner suited to local conditions in order to bring about a rational distribution of forest plantings. In medium-elevation and alpine river-source areas, the focus can be on watershed forests; in low mountain and hill areas or denuded slope areas with severe erosion problems, the focus should be on water-protection forests and special economic forests.

**2. Effective Rural Construction, with Conservation of Water and Soil—**The per-capita arable land area of Northwest China is 0.251 ha; the arable land consists primarily of low-productivity slope areas. Medium- and low-productivity areas account for 85 to 90 percent of the total land area, and 80 percent of the area is subject

to the "three losses" (of water, soil, and fertilizer), so that the potential of arid-zone technologies for increasing output cannot be utilized. As a result, rationally developing land resources is a top-priority matter. After slopes have been brought under cultivation, areas of gentle slopes must be reconstructed. The construction of basic plots is an important measure for strengthening the utilization of arable land. The construction of a variety of such basic plots, including level embanked areas, terraces and small furrow-irrigation areas can be carried on concurrently. In many areas, a variety of measures suited to the conditions may be used, such as building stone-reinforced terraces and walled-off terraces, building dams to create reservoirs, blocking gullies, and the like; of these measures, soil- and fertilizer-conserving terraces are the most effective.

### 3. Integrated Management, Thorough Development—

The basic type of landscape pattern in Northwest China is large areas of mountainous terrain with small areas of level floodplain; land resources are extremely scarce. Drafting programs for the rational utilization of China's land resources is of major importance for the thorough development of this region. In areas with severe environmental damage, a variety of measures must be used. (1) Intensified macroscopic land control, establishment of an effective land resource management organization, and vigorous overall planning for land resources. National land resource development programs should be included in the overall system of programs for the development of the national economy and society. (2) Diversified use of limited agricultural lands in accordance with local conditions, effective three-dimensional development, and maximization of the land utilization rate, the solar energy conversion rate, and the commodity up-valuation rate. (3) The fertility of large areas of barren land should be built up, stubble and straw from crops should be returned to the fields, and crop rotations that include the growing of grasses should be used to increase inputs into the land. Unused land resources should be put into use, and the renovation of medium- and low-productivity fields should be intensified, increasing their output per unit of area. (4) Develop both "channels and shoals," thoroughly use all available land resources, and strive for optimal resource utilization, optimum replacement, and maximum effectiveness.

### 4. Control Pollution, Clean Up the Environment—

The expanding range of human economic activity and its increasing frequency give rise to environmental damage and pollution. The administrative, economic, legal, and public-opinion dimensions must be used to bring about integrated control of pollution. Enterprises with outmoded processes that are heavy polluters may, as appropriate, be abolished, idled, merged, or respecialized;

local sulfur refineries, paper mills and electroplating plants without environmental protection facilities must be put on a modernization program; new paper mills and electroplating plants that are capable of causing pollution and environmental damage too must be put on a modernization program. Construction projects and development projects that may cause environmental pollution or damage must be coupled with stringent environmental protection measures in order to prevent new pollution sources from arising. To deal with agricultural pesticides, pesticides that exceed the standards must be abandoned, with active development of new high-effectiveness, low-toxicity, low-persistence pesticides; the development and dissemination of microorganisms as anti-pest agents must be intensified, and biological, physical and chemical measures must be used to minimize disease and insect damage. The processes and technology of chemical fertilizer production must be modernized, and the output and quality of NP fertilizers and mixed fertilizers must be improved.

### 5. Broaden Sources, Regulate Flow, Decrease Water Shortages—

Water resource utilization should be put under comprehensive management in the context of an overall systems development approach. (1) Within a river-basin system, the legal regulation of natural waters and mountain areas and the centralization of water rights should be instituted, with consistent administration of the water resources protection law, unification of water rights at higher levels, and coordination of the higher and lower levels, with the higher levels having primacy; institute central distribution and central construction within the drainage-basin unit, rather than allowing all units to go their own ways. (2) In the integrated management of mountain areas, natural waters, agricultural land, forests and roads, it is waters, agricultural land and forests that are the main subsystems of the river-basin system, and they must be placed under integrated management. (3) Construction of mountain reservoirs, reconstruction of plains reservoirs. Since the state was founded, numerous plains reservoirs have been established in Northwest China, effectively promoting the regulation of water flow and the development of industrial and agricultural production. In the future, the construction of new mountain reservoirs will be considered, which should both assure sufficient regulation of river flow and provide resources for irrigation, electric power generation, and flood protection. This will be a key factor in regulation at the level of the entire river basin. 4. Draft effective river basin management programs. The hydraulic construction and water conservation departments should take the lead and should coordinate the efforts of the agricultural, forestry, livestock raising and water-management departments to establish an effective river-basin program and to carry on large-scale, planned, effective regulation.

## JAPAN

### Tokyo To Strengthen Regulations Regarding Ivory Trade

OW1504010494 Tokyo KYODO in English 0052 GMT 15 Apr 94

[Text] Tokyo, April 15 KYODO—Japan will strengthen a regulation on domestic transactions in ivory and crocodile skin as part of its obligations under an international treaty to preserve endangered species, Environmental Agency officials said Friday (915 April).

The government endorsed at a cabinet meeting a plan to submit to the current Diet session a revised bill for preserving animals and plants facing extinction.

The revised bill regulates domestic transactions of parts of animals such as skin, plumes and bones, in addition to the bodies themselves, including stuffed ones.

The Washington Convention—the Convention on International Trade in Endangered Species of Wild Fauna and Flora—bans international trade in animal bodies and stuffed animals of species at risk.

Japan ratified the convention in 1980 and enacted a related law in 1987, which is the measure the government is now planning to revise.

The Environment Agency will introduce a measure to distinguish between contraband goods and ones imported legally before Japan started applying the Washington Convention rules.

The revised bill will require importers and processors of animal bodies to register and attach seals or tags of certification to each product, agency officials said.

## SOUTH KOREA

### Prime Minister Chairs Meeting on Environmental Issues

SK1204013394 Seoul YONHAP in English 0015 GMT 12 Apr 94

[Text] Seoul, April 12 (YONHAP)—With the "Green Round" multilateral talks just around the corner, the South Korean Government decided Monday to play an active part in global environmental activities and adopt world environmental standards in industry.

After a meeting of environment-related ministers presided over by Prime Minister Yi Hoe-chang, the government said it would adopt as the Korean Standard (KS) to the norms on environmental management of the International Standardization Organization (ISO) which will be completed by 1996.

The government also decided to join the convention on biological diversity which has been in effect since last

December, the Montreal Protocol and the Copenhagen Protocol or the Amendment to the Montreal protocol in the first half of this year.

The ministers said the country should join by May 15 the second term (July 1994-June 1997) Global Environment Facility (GEF), which was established with the aim of preventing global warming, protecting the ozone layer and world water resources, and preserving the diversity of species.

To that end, the government decided to contribute 5.6 million dollars to the GEF.

In another effort to prepare for the upcoming Green Round negotiations, the government drew up a plan to reinforce the activities of "the task force for the international environmental management standards" set up at the Korea Employers' Association (KEA).

The government hopes that the task force's activities would lead industries to seek environment management systems.

Concerned that perhaps South Korea, sandwiched between the developed and developing countries, may not make itself heard, the ministers who attended the meeting agreed to carry out aggressive diplomacy to defend Seoul's interests during the Green Round negotiations.

The ministers also agreed to minimize trade regulations imposed in the name of environmental protection, given that free trade serves the causes of the world trade organization.

In addition, they decided to host the first intergovernmental meeting sponsored by the United Nations Environment Program (UNEP) to enhance cooperation in Northeast Asia. North Korea will also be invited to the meeting.

To join in global efforts to protect wild animals, the ministers will establish laws banning the sale of tiger bones and tiger-bone medicines by October this year.

Moreover, some 10 billion won will be provided to businesses for the establishment of recycling facilities and waste storage centers.

## PHILIPPINES

### Government Launches Campaign To Protect Ozone Layer

BK1204043994 Quezon City Radio Filipinas in English 0230 GMT 12 Apr 94

[Text] The Philippine Government has acted to help eradicate the use of substances harmful to the ozone layer by 1996 and support this through massive reforestation activities. Spearheading these activities are the Departments of Environment and Natural Resources and Finance and the Land Bank of the Philippines. The



campaign is in compliance with the Montreal Protocol of 1987, wherein signatory countries—including the Philippines—are mandated to do away with harmful substances.

## TAIWAN

### Representative to U.S. Responds to Wildlife Sanctions

OW1204075794 Taipei CNA in English 0655 GMT  
12 Apr 94

[Article by T.C. Hu]

[Text] Washington, April 11 (CNA)—Representative Ding Mou-shih of the Coordination Council for North American Affairs Monday [11 April] expressed deep regret at the U.S. decision to impose trade sanctions against Taiwan for its alleged trade in endangered species parts and products.

"It is deeply regrettable that the United States has decided to rush ahead with sanctions against (Taiwan), despite the recommendation by the Standing Committee of the United Nations Convention on International Trade in Endangered Species (to postpone sanctions)," Ding, head of Taiwan's non-official representative in the U.S. said in a statement.

He said that Taiwan has made aggressive efforts to eradicate the trade in endangered species, adding that "we are concerned that sanctions will cause an unnecessary negative reaction on the part of our people."

Ding added that the Executive Yuan has approved amendments to Taiwan's wildlife conservation law that significantly increase punishments for those convicted of trafficking in endangered species, and that these amendments are expected to be passed by the Legislative Yuan soon.

Taiwan has been conducting an island-wide crackdown on establishments suspected of selling rhino horn and tiger parts, he said. Of the 519 shops that have been investigated so far, six were found to be selling products containing rhino horn powder and 22 were found to be selling tiger products, he added.

Ding reiterated Taiwan's commitment to eradicating the trade in endangered species, and said he believes that dialogue and cooperation rather than sanctions are the best means of achieving progress toward the elimination of endangered species trade.

### Ministry Expresses 'Deep Regret' on U.S. Wildlife Sanctions

OW1204074694 Taipei CNA in English 0711 GMT  
12 Apr 94

[Article by Y.C. Tsai]

[Text] Taipei, April 12 (CNA)—The Ministry of Foreign Affairs issued a three-point statement Tuesday [12 April]

expressing deep regret and dissatisfaction over the U.S. imposition of trade sanctions on Taiwan's wildlife products.

On Monday, U.S. President Bill Clinton issued an order prohibiting import of wildlife specimens and products from Taiwan in retaliation for Taiwan's alleged continued trade in rhino horns and tiger bone.

The Foreign Ministry called the sanctions "obviously unfair and unjust," and criticized Washington for ignoring Taiwan's effort in wildlife conservation, which "is far greater than that of the neighboring countries or areas in this region."

The ministry, however, reiterated that Taiwan remains "determined and committed to the cause of wildlife conservation in spite of the unilateral U.S. sanctions.

Moreover, the ministry urged all ROC [Republic of China] citizens "to recognize the global trend of conservation and comply with the pertinent laws and regulations in full cooperation with the government by refraining from smuggling, trading, consuming, exchanging, or possessing endangered species and their derivatives so as to dissolve the international pressure of sanctions."

The sanctions will reportedly result in U.S.\$20 million to U.S.\$25 million in annual losses for Taiwan and will limit exports of farmed crocodile skins, orchids and farmed coral, local trade officials said.

Sanctions will take effect in 30 days and will continue until December 1994, when the U.S. will review conservation programs in Taiwan and decide whether to extend the import prohibitions.

### Presidential Office: U.S. Sanctions 'Extremely Unfair'

OW1204084994 Taipei CNA in English 0802 GMT  
12 Apr 94

[Article by Sofia Wu]

[Text] Taipei, April 12 (CNA)—It is extremely unfair for the United States to sanction Taiwan for its alleged continued trade in forbidden wildlife products, a Presidential Office spokesman said Tuesday [12 April].

"The Republic of China [ROC] has not lagged behind other countries in preservation of endangered species," Raymond Tai, deputy secretary-general to the president, said after learning that U.S. President Bill Clinton issued an order on Monday prohibiting import of wildlife species and products from Taiwan in retaliation for Taiwan's failure to stop illegal trade in rhino horns and tiger bones.

"We have made enormous efforts to protect wildlife and have launched massive crackdowns on illicit wildlife

product trade in recent years," Tai stressed. "The U.S. should not have used outdated data and photos to back its charges against Taiwan."

Tai reaffirmed Taiwan's commitment to stamping out illegal wildlife trade, saying the Legislative Yuan will soon pass a package of amendments to the wildlife conservation law that significantly increase penalties for offenders.

Premier Lien Chan also blasted the U.S. sanctions as "unjust and unfair," saying the U.S. should take note of Taiwan's progress in wildlife conservation and reconsider its decision as soon as possible.

Lien also ordered the Council of Agriculture (COA) to present within two weeks a comprehensive program for consolidation of rhino horn and tiger bone stocks, crackdown on illicit wildlife trade, wildlife product examination and conservation manpower training.

The COA has set up a special task force to intensify crackdowns on wildlife trade. COA officials said the United States has agreed to negotiate with Taiwan over wildlife trade issues. If the Legislative Yuan can pass the conservation law soon, the officials said, the U.S. may shorten the period of trade sanctions on Taiwan.

#### **'War' Against Trade in Endangered Species Announced**

*OW1404134994 Taipei CNA in English 1300 GMT  
14 Apr 94*

[Article by Debbie Kio]

[Text] Taipei, April 14 (CNA)—Taiwan is embarking on a comprehensive war against trade in endangered species products, particularly rhino horn and tiger parts, an official with the Council of Agriculture [COA] said Thursday [14 April].

The announcement comes on the heels of the U.S. announcement Monday that it was hitting Taiwan with trade sanctions because of its unsatisfactory efforts to stop such trade.

Li Chin-lung, secretary-general of the COA, a cabinet-level organization directly in charge of carrying out Taiwan's conservation policies, said that to win the war, Taiwan will first have to carry out four major tasks requested of it in March by the Convention on International Trade in Endangered Species (CITES).

The four tasks include consolidating stocks of endangered species products, reinforcing marking of the products, accelerating the passage of a revised wildlife protection law, and tightening the crackdown on the trade, Li said.

Li said cracking down on the trade in rhino horn and tiger parts will be given top priority, and added that it would take from three to six years to fully comply with the CITES request.

Li made the pledge after a meeting between COA officials and officials from the Ministries of Finance, Economic Affairs, Justice, Education, and the Department of Health, all of which are expected to back the COA's action plan.

At the Executive Yuan, meanwhile, COA Chairman Sun Ming-hsien said a new conservation strategy would be mapped out within seven days. He also announced that a national wildlife conservation and plant protection conference will be held in mid-July.

Additionally, Sun said, another 130 conservation police will be added to the conservation army around the island, and more wildlife protection units will be established under central, provincial, and county governments.

COA efforts will also include strengthening conservation education programs and promoting information and personnel exchanges with Asian countries in conservation education, Sun said.

#### **Acid Rain Threat Increases**

*OW1404140494 Taipei CNA in English 1247 GMT  
14 Apr 94*

[Text] Taipei, April 14 (CNA)—Acid rain is posing a greater threat to Taiwan than ever before, according to the Environmental Protection Administration [EPA].

An EPA official said the north of Taiwan was at greatest risk, but that the pattern exists around the island.

According to data collected by the EPA from 12 sites around the island from September [word indistinct] through March 1994, the rain falling at Wanli, a coastal township about 30 minutes drive from Taipei, was the most acidic, with an average pH level of 4.3.

pH is a measure of the concentration of hydrogen ions in water. The range of PH values is from 0 to 14. The pH levels from 0 to 7 indicate acidity, with 0 being the most acidic, and pH levels from 7 to 14 indicate alkalinity. A pH level from 6 to 8 is considered safe. The pH levels in rain at all 12 sites the EPA kept statistics for were all below 6.

The EPA statistics show that rain falling at Wanli and Panchiao, a suburb of Taipei, [words indistinct] levels of 3.9 in January, while Yangmingshan and Kuanying—also in the north—also had especially acidic rainfall.

The lowest levels of acidity in rain were found in Taihsi in western Taiwan and Taitung in the southeast. The pH levels there were 5.6—signaling a smaller threat to the environment, but a threat nonetheless.



**THAILAND****Memorandum Signed With Japan on Biodiversity Preservation**

*BK1204080494 Bangkok Radio Thailand Network  
in English 0000 GMT 12 Apr 94*

[Text] Thailand and Japan have agreed to cooperate in the preservation of biodiversity in accordance with the Earth Summit resolution. Director of the National Science and Technology Development Agency Yongyut

Yutthawong has signed a memorandum of understanding with his Japanese counterpart to jointly implement the project to preserve biodiversity. According to the United Nations Convention of Biodiversity, signed by 156 countries on 29 December 1993, biodiversity will be strictly preserved at cooperative efforts among signatory countries—Thailand and Japan included. Mr. Yongyut says the cooperation between Thailand and Japan will enhance the conservation and protection of biodiversity as well as reasonable utilization of flora and fauna, including equal sharing of benefit from the biodiversity. The two countries will exchange data, information, and researchers in the field of biodiversity.

## HUNGARY

### **Paks Nuclear Plant Preparing To Store Radioactive Waste**

*AU1204105394 Budapest NEPSZABADSAG  
in Hungarian 11 Apr 94 p 5*

[Correspondent's report: "Reserve Storage for Nuclear Fuel at Paks"]

[Text] Officials in Paks hope that, in accordance with the signed agreement, Russia will take the spent fuel from the nuclear power station in Paks. At the same time, due to the uncertain domestic situation in Russia, officials in Paks began preparations for the construction of a temporary storage facility, to make sure that there will be no need to stop the power station in case of obstacles in the transportation of spent fuel.

Although environmental protection experts in Moscow argue about the agreement to transport the spent fuel rods to Russia, Paks officials hope that the Russian side would abide by the agreement after all. At the same time, Balazs Kovacs, head of the information office of the nuclear power station in Paks, told us that, due to the uncertain situation, they are already prepared for the construction of a temporary storage facility. The fuel rods must be placed to lie dormant for five years in Paks prior to transportation to Russia. If they only keep adding spent fuel to the storage facility, it will become full by 1995, and if there are no other possibilities of storage, the nuclear power station will have to be shut down, a power station which supplies almost half of Hungary's need for electric power. It is not expedient to take such a risk and, therefore, preparations are under way in Paks to build a temporary storage facility.

As is well known, the joint English-French consortium Alstom, a firm that has gained considerable experience in the construction of such facilities, won the right to construct the storage. The necessary environmental study has been done, and its evaluation is currently under way. Power station experts expect an answer in about one month. The technical plans are also being drawn now, but construction has not yet been started because there is no authorization yet. Only the land is being prepared for construction.

The experts are also conducting information activity among the people living in 12 settlements around the facility. Several people oppose the storage, and a civil movement against the storage has been formed. However, officials in Paks hope that they will succeed in convincing the opponents of the project that the facility is not dangerous. The hearing of the population is still pending, something required by law; no power station in Hungary can be built without this.

### **Environmental Minister Views Bos Debacle**

*AU1804120394 Budapest MAGYAR HIRLAP  
in Hungarian 15 Apr 94 p 3*

[Interview with Environmental Protection Minister Janos Gyurko by Janos A. Szilagyi; place and date not given: "No Breakthrough on the Bos Issue"]

[Excerpts] [passage omitted]

**Szilagyi:** After the fall of the Meciar-government, which represented a rigid position also regarding the Bos river barrage issue, many people hoped for an improvement in relations and progress in settling the Bos issue. Did the meeting in Bratislava justify these positive expectations?

**Gyurko:** Regarding the inter-ministerial cooperation, the Slovak side showed a constructive attitude. They showed a positive approach toward solving the common environmental and nature protection problems, and gave up the planned construction of the dangerous waste incinerator plant in Parkany, which would strongly pollute the air in the Dorog-Esztergom area. We decided to create a joint cooperation committee within 30 days to tackle concrete issues, a committee led by the two public administration state secretaries. I cannot report, though, on serious progress in the Bos issue. However, it is a promising development that these talks were held in a better atmosphere than previous talks.

**Szilagyi:** Did the two positions get closer to each other?

**Gyurko:** Very few concrete things were said, because the presentation of each side's position took up most of the time. At first, the Slovaks opposed the idea of maintaining the mediatory role of the European Union; instead, they suggested bilateral talks. Later, however, they gave up this idea. I made it clear that, at the talks on the distribution of water, we seek a temporary solution valid until the decision of the Hague International Court, and not a final solution. I also made it absolutely clear that Hungary continues to expect a solution to the problem from The Hague. I presented the latest decision of the Hungarian Parliament on the supply of water to the Szigetkoz area. In connection with this, I asked them to take concrete measures to protect the Hungarian natural environment and let more water in the main Danube and into the Mosoni-Danube branch. Mr. Hrascko promised to support the flow of some 20 cubic meters of water per second into the Mosoni Danube. This would signify definite progress in saving the Szigetkoz area, because we could redirect this surplus water in the various side branches of the Szigetkoz area and, thus, the costs of pumping would drop. [passage omitted]

**Szilagyi:** Did you also talk about the serious technical fault involving the sluice chambers at Bos and the subsequent halt in the navigation of the Danube?

**Gyurko:** The Slovak delegation said that the sluice chambers problem was an unpleasant development that came

at the wrong time. It seems that the reports on the upcoming opening of navigation on the Danube are unfounded and it is possible that the repair works will

last for another month. The task of the Danube committee may be to settle the issue and discuss the possible compensation demands. [passage omitted]

## REGIONAL AFFAIRS

### **Ecuador Receives Loan From IDB for Environmental Projects**

PA1404164294 Mexico City NOTIMEX in Spanish  
2058 GMT 11 Apr 94

[Text] Guadalajara, 11 Apr (NOTIMEX)—Cesar Robalino Gonzaga, Ecuadoran minister of finance and credit, signed with the IDB here today a contract for \$14.9 million for an ecological protection program.

IDB Spokesman Carlos Brezina reported that the program is intended to reduce and control environmental damage in estuaries, mangrove swamps, and other natural resources along the Ecuadoran coast, as well as to strengthen the country's capacity to protect, handle, and rehabilitate coastal ecosystems.

Robalino said the program includes a subprogram to implement coastal resource development plans and to implement 120 projects for the administration of mangrove swamps and coastal areas, environmental cleanups, handling and conservation of marine resources, and community organization.

Brezina explained that the project's goal is to improve the economic opportunities of residents along the Ecuadoran coast and to increase revenues derived from ecotourism and aquaculture.

At the signing of the contract it was said the 2,860 km of Ecuadoran coastal line present [words indistinct] "conflictive" demands of tourism, the exploitation of shrimp and a [words indistinct], added that the project to be implemented by the Executive Directorate of the Program for Handling Ecuador's Coastal Resources will cost \$16.5 million. Local funds for the project total \$1.6 million.

The contract between the IDB and Ecuador was signed this Monday in Mexico's western city of Guadalajara within the framework of the 35th Annual Meeting of Governors of the institution. The meeting is scheduled to end on 13 April.

### **Southern Cone Environmental Issues**

PY1404184494

[Editorial Report] The following is a compilation of reports on environmental issues monitored through 14 April:

#### **Argentina**

About 300 metric tons of garbage was shipped from military bases and shelters in the Antarctic to the port of Buenos Aires, the Argentine Navy reported in the last week of March. The garbage was brought by the icebreaker *Almirante Irizar* on its return from the 1993/94 Summer Antarctic Campaign. In a press communique, the Navy said the cleanup of Antarctic bases follows the strict

international regulations on conservation in the area contained in the Antarctic Treaty's 1991 Protocol of Environmental Protection. The protocol was ratified by Argentina last October. The shipment included scrap metal, plastic, metal, food remains, cables, tubes, wires, and other materials used by workers. The waste will be dumped in landfills. (Buenos Aires BUENOS AIRES HERALD in English 2 Apr 94 p 5)

#### **Brazil**

Japan has guaranteed Brazil \$66.4 million for the Japanese-Brazilian Cooperation Program for the Development of the Woodland Savannah, *Proceder*. Of this, 80 percent will be financed by the Japan International Cooperation Agency, JICA, and the remaining 20 percent by private banks. The project will focus on an area of 80,000 hectares in the states of Maranhao and Tocantins, part of which will be used for agriculture and the other part for forest reserve, preserving the environment. (Rio de Janeiro O GLOBO in Portuguese 1 Apr 94 p 18)

The Brazilian Institute of Geography and Statistics has reported that 303 species and subspecies of the Brazilian fauna are in danger of extinction. Experts estimate that 24 of them, especially birds, are in serious process of extinction or could have disappeared. Areas of the Pantanal reserve in Mato Grosso, and the Amazon Basin are registering an increasing extinction process because of deforestation, indiscriminate burning, clandestine hunting and fishing, pollution of rivers, among other reasons. (Madrid EFE in Spanish 2224 GMT 12 Apr 94)

#### **Chile**

The Navy has ordered special emergency measures following an accident in which three containers with sodium cyanide fell into the sea. The accident occurred off (Tunquien Bay) near Valparaiso on 9 April. The containers fell from the Bahamas flagged ship *Camina*. (Santiago Television Nacional de Chile Imagen Internacional in Spanish 0100 GMT 12 Apr 94)

Chilean Agricultural Minister Emiliano Ortega on 8 April condemned the illegal destruction of a vast native forest in the Chilo region by the Philippine Golden Spring Forestal de Chile consortium and backed the \$50,000 fine imposed on the company. Ecologist groups state that about 120,000 hectares of forests are destroyed per year. (Madrid EFE in Spanish 2336 GMT 8 Apr 94)

#### **Uruguay**

The Colonia City Hall has promulgated regulations to effectively preserve the native flora in Colonia department in keeping with the 1987 Forest Law. Severe sanctions are foreseen for those who violate the norms. (Montevideo LA MANANA in Spanish 29 Mar 94 p 35)

The National Farm Research Institute, INIA, and Botanic Garden representatives on 23 February signed an agreement to improve the native flora preservation and to promote rational exploitation. (Montevideo BUSQUEDA in Spanish 7 April 94 p 43)



## INDIA

**Cryogenic Payload To Measure Ozone Depletion Launched**

*BK1604160094 Delhi All India Radio Network in English 1530 GMT 16 Apr 94*

[Text] The indigenously developed cryogenic payload for measuring ozone depletion was successfully launched from National Scientific Payload Facility in Hyderabad today. Our Bangalore correspondent reports that with this, ISRO [Indian Space Research Organization] has become one among the very few countries in the world to develop and successfully employ this advanced cryogenic technique. Part of ISRO's geosphere program, the cryogenic payload will also measure the greenhouse warming substances in the atmosphere.

**Destructive Potential of Development Detailed**

*94P50116A Bombay NAVBHARAT TIMES in Hindi 16 Mar 94 p 4*

[Report by Sunderlal Bahuguna: "Black Shadow of the Demon Named Development"]

[Text] The threat of the end of the human race caused by the neglect of our environment has not stopped. The past four decades of economic development have culminated in a global awareness, and the "State of the World Report 1994" has presented additionally some irrefutable and shocking facts. These became apparent at the meeting of the World Awareness Group, which has scientifically evaluated the developmental activities of the past four decades and has adopted the mandate to direct the course of action for the next 40 years. The administrators, policymakers, and sociologists of the world have been using this report as a path finder. It has been translated into 27 languages. Ten million copies of the English edition alone have been printed from New York, London, and New Delhi. Eleven hundred copies were distributed among world leaders participating in the recent International Financial Forum in Davos.

The first disadvantage of making economic advancement the goal of development has been an imbalanced and astounding grabbing for ownership of the substances that keep the earth alive. Before human intervention, the production capacity of earth-related materials from forests and pastures was about 150 billion tons. Humans destroyed about 12 percent of this and used about 27 percent. Thus 40 percent has already been used up by humans, leaving only 60 percent for other living things. This 40 percent is from that portion which was easily accessible to humans. Now, the trend is to reach for more and more.

What will be the result of this? When the forests are invaded too much, it impacts the water resources. In spite of the noise made about the preservation of forests, 130 million hectares of the world's forests have been destroyed from 1970-90. The majority of these were

tropical forests, which were home to and a treasury of many varied species of flora and fauna. In destroying these forests, a delicate balance of biodiversity, forest resources, and a well-established eco-system of symbiotic creatures has been irrevocably upset. The procreation and natural balance has been replaced by a market philosophy of industrial production, based on human selfishness. Biotechnology, acclaimed widely as the hope of the future, is the biggest culprit as it sucks the earth repeatedly, until there is nothing left.

The same thing that was done to the forests has been repeated with farm lands. Four decades of development have been showing astounding food and other production due to the green revolution. Along with improved food grain production, meat production has also increased 2.6 times.

This would have made those pushing for advancement happy, except that after 1984 there was a sudden decrease in food production. The increase had been a direct result of improvements in irrigating and fertilizing techniques. A ton of fertilizer used to yield 9 tons of produce, but once the productivity zenith was reached, it fell to only 2 tons. Between 1984 and 1993, the annual food production went down from 29 million tons to only 12 million tons. In the next 40 years, by the year 2030, should the same condition prevail, the yield would only be 248 kg per capita, compared to the top production year 1984 with a per capita production of 346 kg. The fluctuation in food production directly impacts meat production. We must not assume wrongly that the per capita growth in food production has met food demands and has led to self-sufficiency and uplifting of living standards of the poor. This misconception can be dispelled by looking at the per capita consumption statistics worldwide. The annual per capita food consumption for Canada was 974 kg, and for the United States, 860 kg, when for India it was 186 kg, and for Bangladesh 176 kg! This striking difference is because those countries' greatest use of food products is to convert them into fodder for obtaining animal-protein in the form of meat, eggs, and milk. An American's average annual consumption includes 42 kg of beef, 28 kg of pork, 44 kg of poultry, and 271 kg of milk, whereas an Indian's food consumption is mainly to wipe out hunger, and stay alive.

There has been an extraordinary increase also in fisheries. It had increased to an annual production of 100 million tons in 1990, from a mere 22 million tons in 1950. The per capita consumption had risen from 9 kg per year to 19 kg, but now there is a marked decrease in this also. This has decreased to only 11 kg per capita. The main reason for this is the pollution of the ocean floor from where 90 percent of the fish are obtained.

This picture of economic development makes it clear that our planet is hurtling towards its demise. The dance of death will be felt more acutely in the poorer nations since the peoples of these countries are more directly dependent for sustenance on water, forest, and earth



resources. Converting to a market economy has brought about a basic change in their generations-old ways of living, and traditions. The temple of economics is the market and money its god. Even in this the place for foreign currency, especially the "dollar" has the highest place. The industrialized nations of the world have trapped the rest of the world into the spread of this snake's hood of market economy so that probably there is no nation left whose leader does not have to supplicate himself to this method. They are acquiring materials through free trade. Under this system it really does not matter who rules a country. Those who accept this way have only one rule—economic slavery. It is clear from the examples of Japan and the Netherlands how countries that make trade their mainstay remain affluent, even when they lack basic natural resources. Japan sells cars and computers, and from that income buys food, wood, oil, iron, and other raw materials. The Netherlands uses 10 percent of its farm, pasture, and forest lands for production. Japan's annual per capita national production is \$18,000. Japan's trade stretches far to Canada, whose forests have been leased by Japan for a long while now. The clearing of the tropical forests in neighboring East Asia is for its expanding self-indulgence, and to fulfill its commercial needs. The aborigines, who have already been rendered poor by deforestation, are being pushed towards starvation.

The exports and imports of these countries can show us how they keep their trade balanced. Holland exports milk and milk-products, while it imports the fodder for its cattle from far-off Thailand. India is a big importer of crude oil. In 1989/90, we imported 5.460 billion rupees [Rs] worth of crude oil. There is a permanent goal to improve this. India is also importing the dung from Dutch cows, since there is a danger of Holland's rivers becoming polluted by it. These cows are sent to the slaughter-house anyway once they stop yielding milk.

The increase in population in the next 40 years will be significant. The world population has doubled in the last 40 years from 2.50 billion to 5.2 billion. And every year it has increased by 70 million. The next 40 years are likely to see an increase to 8.900 billion. That means a yearly 90-million increase. The rate of increase in Western countries will be very low. In Russia and in Italy, the population will decrease by 1 and 2 million, respectively. In the last 40 years in India, the population has shown an increase of 307 million, and an increase of 590 million is expected in the next 40. We will rank second only to China, as we already do, with a population count of 1.443 billion.

The dreams of a comfortable life that poor nations dream and the promises of their governments of bright futures all will get crushed. During 1950-60, the rate of economic growth for the world was 4.9 percent and per capita was 3.1 percent. During 1990-93 it dropped to 0.9 and 0.8 percent, respectively. It can be argued that these are global figures, and in a developing nation like India, the annual rate of growth has been higher. No matter how good the growth, the benefits from it reach only the

handful of people controlling the power and the economies of these rich and poor nations.

These developments are issuing a warning to develop new methods of survival, other than those aimed at economic growth. It would be foolish to ignore this warning, saying that it may be a matter of choice for the rich nations to leave the path of prosperity through economic growth, but a poor country has no option and cannot give it up.

From the Himalayas in the north to the oceans in the south and east, I witnessed for one week (17-24 February) the battleground where this is being fought. In Tehri, the highest dam in Asia, at 260.5 meters, has been constructed, killing the effluent Bhagirathi river, submerging a 42 sq km plain, and uprooting 100,000 people. Why? To sustain big, mainly export-oriented industries; to provide a few more hours of electricity at night to the cities; to increase the production of exportable sugarcane in western Uttar Pradesh, which is already 100-percent irrigated; and to meet the increased demand for water of the fun-seeking tourists that come to Delhi's five-star hotels. In Medhak Zilla near Hyderabad, on 300 acres of farmable land, an Alkabar slaughterhouse with the capacity for killing 120,000 cattle has been built. In the seashore city of Tanjore, the granary of the south, fisheries are set up at the cost of destroying 10 thousand hectares of farmable land. As I coursed along the seashore to the north-east towards Orissa, I found that there also these fisheries have been established, destroying sealife and forests on the seashore. There is a plan to commercialize the seashore areas of Puri by constructing hotels for tourists. Delhi has announced agreements to export 15,000 tons of buffalo meat every year to the Philippines and buffaloes to Vietnam. Animal and animal-product exports are going to increase from Rs3 billion to Rs20 billion per year.

Behind all these plans is the clout of influential political leaders, i.e., the elected representatives of the people of these regions. In the end, the result of such pressure cannot be anything other than the consumption of the very last lump of the flesh of silent nature and the silent millions with their filial dependence on her.

#### **Plan To Cleanse Polluted Rivers Revealed**

94WN0236A Bombay THE TIMES OF INDIA  
in English 23 Feb 94 p 3

[Text] New Delhi, Feb 22 (PTI)—The government has taken the first step to cleansing polluted stretches of 17 major rivers in the country by approving in principle an approach paper on the subject, the Lok Sabha was told today.

The implementation of schemes for pollution abatement would be taken up in 1994-95 in 46 towns in 12 states and would be in addition to the schemes approved for de-pollution of the Yamuna, Gomti and the Ganga, the environment minister, Mr. Kamal Nath said.

Studies to assess pollution loads have been taken up with a view to formulating schemes of pollution abatement in these cities, the minister said.

The 17 major rivers which would be cleansed in their polluted stretches include Sabarmati in Ahmedabad, Gujarat, Satluj running through Ludhiana, Jalandhar, Phagwara and Philur in Punjab, Subarnrekha flowing through Ranchi, Ghatsilla and Jamshedpur in Bihar, Godavari and Krishna running along Nanded, Nasik, Karad and Sangli in Maharashtra.

The stretches of the same rivers when they flow in the Andhra cities of Bhadrachalam, Mancherial, Ramagundam and Repalle.

In Tamil Nadu the Cauvery would have to be cleaned at Grant Anicut, Kumbakonam, Tiruchirapalli, while in Karnataka the Cauvery and Tungabhadra would have to be cleansed in the cities of Chickamangalur, Belur, Mysore, Thirthahalli, Bhadravati, Shimoga, Hogenakkal and Pagalur.

In Rajasthan the pollution abatement would have to be in the cities of Kota and Kesoraipatan where flows the Chambal river.

In Orissa the Baitarni and Brahmini would have to be cleaned at Chandbali and Dharamshalla.

#### Trade Link With Environment Decried

94WN0236B Bombay THE TIMES OF INDIA  
in English 18 Feb 94 p 15

[Text] New Delhi, Feb. 17—India has opposed the developed countries' move to link trade with environment, emphasising that GATT [General Agreement on Tariffs and Trade] or any other forum—trade or otherwise—should not be allowed to review national developmental priorities.

Addressing a round-table discussion on 'Perspectives of developed countries: environment and trade' at Geneva on Thursday, the minister for environment and forests, Mr Kamal Nath, said, "let not plain protectionism be passed off as environmental concern."

The round-table talks have been organised by the United Nations Environment Programme in coordination with UNCTAD [expansion not given], environment ministers of 15 countries, including the United States, the UK, Brazil, Malaysia, Norway, Austria, Mexico, India, Japan, and China are participating.

Calling for a moratorium on linking trade with environment, "unless it clearly impinges on collective ecological security," Mr. Kamal Nath said the environmental action "is to flow out of free will in an atmosphere of shared global concern."

He reminded the participants of the Agenda-21 agreed at the Rio Summit to stress that "we have to assiduously strive to ensure that any decisions which attempt to bring in environmental considerations to modify trade relations conform rigorously to the Rio consensus."

Mr. Kamal Nath termed the efforts to put environmental barriers on trade as a kind of "green imperialism" and said that the whole idea of international eco-labelling based on processes amounted to legitimisation of extra-territorial interference.

"We agree that environmentally-harmful processes must be stopped and that overexploitation of non-renewable resources must be controlled, but the solution lies not in unilaterally banning trade but rather in transferring technology and offering prices to developing countries for such commodities which would not then necessitate their over-exploitation or jeopardise their developmental priorities," Mr. Kamal Nath told ministers of the leading countries.

He explained that while dumping the eco-labelling schemes in some western countries which give value only to environment-friendly chemical dyes, they ignore natural dyes completely even though they are equally, if not more, ecologically sound. "Thus, Asian countries which are major manufacturers and exporters of textiles cannot earn an eco-label which should rightfully be theirs."

Rejecting the developed North's concept of forest conservation which entails locking-up developing countries' forests and leaving them untouched, Mr. Kamal Nath said: "Forests in India are a community resource. These communities use forests, by and large sustainably. This may not fit into the western idea of conservation, and yet we maintain that so long as the use is sustainable, it does mean conservation. This exemplifies the contention that ... environmental standard or specifications are country specific."

In case of trans-boundary environmental effects, Mr. Kamal Nath said the "affected nations have the right and duty to safeguard their vital concerns." Where there are cases of blatant trans-boundary effects, such matters should be dealt with by genuine multilateral mechanism, the minister added.

Talking of product standards, Mr. Kamal Nath said while harmonisation of product standards if necessary, it cannot be a single standard on a global basis.

Different countries have different ambient levels of pollution, different environmental assimilative capacities and different social and economic problems and objectives. "It would be necessary to harmonise standards in groups—the groups could be product-wise or region-wise or, better still an innovative combination of both these."

## RUSSIA

### Nuclear Waste Leak Feared From Underground Store in Siberia

LD1104150694 Moscow INTERFAX in English  
1327 GMT 11 Apr 94

[Text] Head of the nuclear safety research center of the Socio-Environmental Union Vladimir Chechetkin has expressed fears about a possible leak of liquid nuclear waste pumped into underground streams at a nuclear facility outside Krasnoyarsk named Krasnoyarsk-26.

In an interview with Interfax, he said that no thorough geological study of the area had been conducted though the underground nuclear waste storage at the Severny test site had been in use for 30 years.

Chechetkin does not rule out that the nuclear waste is not leaking out onto the surface through cracks. The test site is about five kilometers away from the Yenisey River, a fact causing particular worry by Russian environmentalists.

He also spoke of as many as 10 contaminated spots being found along the main pipeline through which the waste is pumped from the facility to the site, with radiation levels 200 times higher than normal background radiation.

Among other substances, the waste contains plutonium whose half life is 24,000 years.

Experts fear that contamination may spread over a larger area. This raises particular dangers in as the plant management obtained a licence for collecting wild berries, mushrooms and herbs there.

Chechetkin said that plans were under way to put up a new facility for reprocessing nuclear fuel and that the project provided for the burial of tritium at the Severny site.

He warned about dire implications from the continued pumping of liquid nuclear waste underground.

### 'Experts' Urge Adoption of Package of Nuclear Safety Laws

PM1104103594 Moscow ROSSIYSKAYA GAZETA  
in Russian 9 Apr 94 First Edition p 3

[Undated letter signed by "Experts on Nuclear Law" A. Ioyrysh, V. Kiselev, U. Margulis, V. Menshikov, Ye. Nesterov, A. Protsenko, Yu. Rogozhin, Yu. Fedulov, V. Filonenko, R. Sharafutdinov, and A. Shramchenko: "Nuclear Laws Have Been Written but Are Languishing in Parliamentary Archives"]

[Text] The history of civilian and military nuclear power dates back almost 50 years. But we still do not have a single federal legislative act directly regulating the use of nuclear energy. You get the impression that the legal

vacuum here suits the competing branches of power, the nuclear power industry departments, and industry down to the ground.

Prior to the events of October 1993, one of the initiators of the systematic approach to nuclear legislation was the Radiation Safety Subcommittee of the Supreme Soviet Committee on Ecology. The subcommittee spent three years studying problems of nuclear and radiation safety in Russia and cooperated with the U.S. Senate and the European Parliament in this work. Its portfolio contained the most important legislative initiatives: a draft concept of the legal backup for the use of nuclear power, draft laws on problems of the treatment of radioactive waste, the application of nuclear technologies in the national economy, nuclear power station safety, and others. In conjunction with the draft Law "On the Use of Nuclear Energy," which was prepared by the Russian Federation Supreme Soviet Committee on Industry and Power Generation, they could soon have become the basis for Russia's nuclear law. But they did not.

Today neither the Russian Ministry of the Environment and Natural Resources nor the government departments which deal with safety problems are showing the due interest in the continuation of that work. Clearly it is easier to live according to departmental instructions. As a result radioactive waste, for example, will continue to be poured into the ground and into water systems. The most dangerous products—highly radioactive liquid waste—will be buried deep in the earth as a "gift" to future generations.

Clearly it does not make sense for the State Duma to begin entirely from scratch and it is necessary to make use of the existing draft documents.

What are the most important principles that we propose, insisting on the systematic regulation of legislation in the sphere of the use of nuclear energy?

1. In the use of nuclear power Russia will be oriented toward the priority of protecting the health of the population and the natural environment over economic benefit;
2. The state will monitor the safety of installations using nuclear power regardless of their forms of ownership;
3. The regulation of safety and oversight in the sphere of the use of nuclear power both in the national economy and at installations of the Russian Federation Defense Ministry must be exercised by a single state organ;
4. The population and public organizations must take part in the discussion of questions of ensuring safety in the use of nuclear power and this participation must be enshrined in law;
5. A triad consisting of a federal organ, a component of the Federation, and organs of local self-government must take part in the solution of the most important questions (the siting of nuclear power stations and the storage of radioactive nuclear waste);



6. The final decision on the siting of potentially hazardous installations using nuclear power must take the population's opinion into account;

7. The departmental norms must unconditionally be based on federal laws of the Russian Federation.

After the effective blocking of nuclear legislation in the Supreme Soviet, the adoption of the Russian Federation Constitution, and the subsequent hiatus in the legislative organ's activity, the time has come for those departments which use nuclear power to finally realize that the present situation is intolerable. The government must exercise its right to initiate legislation in this sphere.

As a result of U.S. President Bill Clinton's visit to Russia and the subsequent accords on deliveries of enriched uranium to the United States, the Ministry of Atomic Energy could become the largest holder of hard currency. It is to be hoped that at least a small proportion of the resources earned at installations which represent an enhanced danger to the population and the natural environment will be allocated by the Ministry of Atomic Energy to the formation of a nuclear law. The atom will not remain without rights forever in Russia!

[signed] Experts on nuclear law A. Ioyrysh, V. Kiselev, U. Margulis, V. Menshikov, Ye. Nesterov, A. Protsenko, Yu. Rogozhin, Yu. Fedulov, V. Filonenko, R. Sharafutdinov, and A. Shramchenko.

#### **Radioactive Industrial Waste Dumped Near Moskva River**

*PM1104084394 Moscow Russian Television Network in Russian 1000 GMT 31 Mar 94*

[From the "Vesti" newscast: Video report from Moscow Oblast's Polymetal Plant by L. Varebrus and V. Stupin, identified by caption; figures in brackets denote broadcast time in GMT in hours, minutes, and seconds]

[Text] [101254] Varebrus over video of padlock, barbed wire fence, and sign reading "Stop! No Entry!": Even today production facilities here are kept behind seven seals, and the barbed wire fence and awesome sign are no mere stage props. But there are no secrets behind these gates. There is waste ground. The gates are opened only very rarely. The predecessors of the present plant created a very dangerous neighborhood here—a radioactive dump of their own waste, and what is more, directly on the banks of the Moskva river, as you can see.

Unidentified man carrying radiation counter: Right by the gate—10 microroentgen... Uh-oh—132...520...divided by four that is 130.

Varebrus to camera over video of snowy landscape: Not a negligible quantity. Incidentally, this is not just a dump. The land belongs to the Kolomna museum. If you dig, you can find up to 1,300 microroentgen per hour. And on the surface up to 650. Not everywhere, of course. Just in certain places. Waste emitting more than 300

microroentgen is subject to burial at a special facility near Sergiyev Posad. Initially, nothing was known about this danger, subsequently it was kept secret, and now, when it would be possible to remove this filth—uranium, thorium, and radium lie buried under the snow here—the money has run out. So production managers from the present polymetal plant have themselves sounded the alarm.

V. Sotskov, deputy director for safety and emergency situations, identified by caption: The simplest solution would be if the waste could simply be taken away. But, as I have already said, it is technically impossible to dig it up, or cover it up somehow. The bank will be destabilized and the deposits will slide into the Moskva river.

Varebrus: True, the radioactive substances would not dissolve in water. But they would accumulate in the silt and pass into fish. And so there is only one solution—look for and find the money necessary to protect our health. [101424] [video shows waste ground, men with Geiger counters, surrounding countryside, interview]

#### **Ecology Committee Head Condemns Hungarian Waste Protocol**

*LD0904192794 Moscow Mayak Radio Network in Russian 1530 GMT 9 Apr 94*

[Text] On 3 March, Deputy Zlotnikova sent a question to President Yeltsin and Prime Minister Chernomyrdin regarding the location of radioactive waste on Russian territory and, in particular, on the intention of the Russian Government to accept a proposal by the Hungarian side to store radioactive waste from its nuclear power stations on the territory of Orenburg Oblast. On 8 April, the State Duma adopted a statement by the Yabloko Faction on holding parliamentary hearings on the matter in question in the near future. Here is Tamara Vladimirovna Zlotnikova, deputy chairwoman of the State Duma Committee on Ecology and member of the Yabloko Faction.

Zlotnikova: I received an answer to my question from the Russian Ministry of Atomic Energy; the answer is striking not only in its environmental and economic illiteracy but, I would say, also, to a certain extent, in its cynicism. They write that the Hungarian waste will not be a significant addition to our own radioactive waste. The main aim, then, behind the signing of this contract is quite obvious, and it is a pity that strategic documents, especially ones that concern environmental issues, are not used as bases for making state decisions—that is both the president's message on strengthening the Russian state in the area of ecological problems and the president's edict on the Russian state strategy on protecting the environment, which identifies the guarantee of the population's safety from radiation as one of the main problems in the realization of the constitutional rights of citizens of Russia to a safe environment.

The bluntly expressed departmental position of Minatom is being used as a basis for making decisions at

the state level. And the main task of this agreement is the guarantee of a stable, long-term hard currency income, which will enable funds to be directed into rehabilitating territories [polluted by radiation]. Well, this is really a cannibal's point of view. First we poison the land and then we spend part of the currency we get on rehabilitating the territory. This is immoral as far as Russia's inhabitants are concerned. It is not only anti-ecological but anti-people.

And so, we got the support of the entire Duma. We are waiting for an answer from the president and from Viktor Stepanovich Chernomyrdin. We would not like to see Russia getting such anti-ecological presents from him. Therefore, the Yabloko Faction was unanimously supported by all of the Duma. No economic difficulties, even Russia's disastrous financial situation, can justify the signing of this protocol. It is unjustified from the points of view of the economy, politics, and the law. It would be immoral to turn Russia into an international waste dump.

#### **Controversy Over Plans to Bury Hungarian Nuclear Waste**

*LD0804202394 Moscow Radiostantsiya Ekho Moskv  
in Russian 1500 GMT 8 Apr 94*

[Text] Announcer: The Chelyabinsk Oblast Administration has agreed to store radioactive waste from Hungarian atomic power stations. As our correspondent reports, the population has not been informed of this. It should be added that the relevant protocol on waste storage was signed last Saturday in Budapest by Prime Minister Viktor Chernomyrdin. Presidential Press Secretary Vyacheslav Kostikov laid out the position of the president at a briefing today. [begin recording]

Kostikov: We are talking about the processing and utilization of waste from those atomic stations that were built according to Russian or Soviet, as they were then, designs with participation of Russian technology. The agreements signed back then obliged Russia to process, export to its territory, and store waste products. [end recording]

Announcer: In the meantime, Aleksandr Shuvalov, the head of the press service of Russia's Ministry of Environmental Protection and Natural Resources, has the following to say: [Begin recording]

Shuvalov: References to the existing practice of accepting and storing exhausted nuclear fuel from the Czech Republic, Bulgaria, and Finland will not work in the given case. The agreement between the governments of the USSR and the People's Republic of Hungary of 22 December 1966 did not provide for importing nuclear fuel. The agreement left out this point and now attempts are being made to repair the omission. Decisions of this sort are making the already serious radio-ecological [radioekologicheskaya] situation in our country even

worse and opens the door to a flow of other waste materials that are no less harmful for the environment. [end recording]

#### **Expert Says Chelyabinsk Chemical Plant 'Disaster Area'**

*LD1204163094 Moscow INTERFAX in English  
1138 GMT 12 Apr 94*

[Text] An expert of Russia's Social-Ecology Union Marina Khotuleva told newspeople in Moscow that the radiological situation in different areas of the Russian Federation was complicated owing to the continued operation of the state nuclear complex facilities. More specifically, the environmentalists are worried about the situation at the chemical plant Mayak in the Chelyabinsk Region of the Urals.

According to the Social-Ecology Union, Mayak produces daily up to 100 Mn [million] curie [Ci] of radioactive waste and dumps more than 1 Mn Ci into the lakes Karachai and Staroye Boloto. The two lakes are responsible for the contamination of the region's underground waters.

Mayak operates in a zone of high seismic activity where earthquakes of up to 7 points on the Richter scale can take place, at the same time a number of man-made lakes with a total of some 400 cu m [cubic meters] of liquid radioactive waste in them have been dug out in the main flow of the Tech River.

The large amount of radioactive waste in the Cheliabinsk Region explains why there are 60 percent more cases of children's leukemia in Cheliabinsk-65 and Cheliabinsk-70, where Mayak operates, than in other industrial centers.

The Social-Ecology Union feels the region must be declared an ecological disaster zone.

#### **Environment Ministry Hits Hungary N-Waste Deal**

*PM1404134394 Moscow ROSSIYSKIYE VESTI  
in Russian 14 Apr 94 p 2*

[Report by unidentified correspondent under general headline "Is 'Foreign' Radioactive Waste To Be Buried in Our Country?": "Position of the Ministry for the Protection of the Environment and Natural Resources: This Decision Will Exacerbate the Radiation Pollution Situation in the Country"]

[Text] The appearance of the government document to which was appended the draft protocol providing for the burial of vitrified radioactive waste on the territory of the Russian Federation came as a total surprise for the Ministry for the Protection of the Environment and Natural Resources [Minprirody], Aleksandr Shuvalov, head of the press service of Russia's Minprirody, told ROSSIYSKIYE VESTY's correspondent. Minprirody

did not agree with the document in this form, and in principle could not agree with it in such a version.

Moreover, back in December 1993 the ministry sent its comments on the draft protocol, clearly stating the need for strict observance of the "Procedure for Receiving Spent Nuclear Fuel From Foreign Nuclear Electric Power Stations for Subsequent Reprocessing." Incidentally, this regulatory document was ratified by the Ministry of Atomic Energy and completely unambiguously requires reprocessed spent nuclear fuel to be returned to the supplier.

Strictly speaking, there is nothing surprising in the stance taken by the environmental protection organs. They dismiss out of hand any idea connected with the burial of radioactive waste—indeed, of any other toxic waste—in our country. Moreover, a legal norm also exists—in the Law "On the Protection of the Natural Environment," Article 50 of which expressly forbids "the importation of radioactive waste or materials for the purpose of storage or burial." And references to the existing practice of receiving and burying spent nuclear fuel from the Czech Republic, Bulgaria, and Finland, do not apply in this case, since this practice is based on agreements concluded before the adoption of the law, and which therefore do not come under that law.

In the agreement with Hungary the clause on the acceptance of nuclear fuel was "omitted." And now attempts are being made to repair this omission by means of the enticement that this is very profitable for Russia. Yet the latter argument is highly dubious. What is beyond doubt is that such a decision would exacerbate the already serious radioactive pollution situation [radioekologicheskaya obstanovka] in our country and open a "door" through which other waste, no less harmful to the environment, will flood in. And then what? We buy a clean environment on import, perhaps...?

The agreement on the burial of nuclear waste on Russian territory signed by Viktor Chernomyrdin in Hungary is within the framework of the obligations which Russia, as the USSR's successor, must fulfill. The head of state's press secretary Vyacheslav Kostikov set out this position at a briefing in the Kremlin at the request of the Russian Federation president and prime minister.

In Kostikov's words, the agreement signed in Hungary concerns the reprocessing and recycling of nuclear waste from nuclear electric power stations built to Soviet plans and using Soviet technologies. "As soon as the international treaties elapse, Russia will avoid concluding such agreements," Vyacheslav Kostikov remarked.

#### **Nuclear Waste Deal With Hungary Defended**

*PM1404115594 Moscow ROSSIYSKIYE VESTI  
in Russian 14 Apr 94 p 2*

[Unattributed report under the "Position of the Russian Ministry of Atomic Energy" rubric and the general

heading "Is 'Foreign' Radioactive Waste To Be Buried in Our Country?": "The Protocol Does Not Run Counter to Russian Legislation"]

[Text] The protocol to the existing intergovernmental agreement of 28 December 1966, which was signed 1 April 1994 by Minister Viktor Mikhaylov on behalf of the Russian Federation Government, juridically confirmed the fulfillment by Russia, as the state taking over from the USSR, of the obligations to Hungary which existed prior to 1991.

In accordance with the protocol:

"The appropriate organizations of the Russian Federation pledge to supply, and organizations of the Republic of Hungary to purchase, nuclear fuel in the form of ready-made fuel assemblies and control assemblies throughout the period of operation of the 'Paks' Nuclear Electric Power Station in the volumes necessary for the annual recharging of the reactors."

"The appropriate organizations of the Russian Federation will accept spent nuclear fuel from the 'Paks' Nuclear Electric Power Station in the form of fuel assemblies and control assemblies, after being held for five years at the 'Paks' Nuclear Electric Power Station, throughout the period of operation of the 'Paks' Nuclear Electric Power Station on terms analogous to the acceptance of spent nuclear fuel from other countries under intergovernmental agreements concluded by the USSR prior to 1991," i.e. prior to the Russian Federation's adoption in December 1991 of the Law "On Protection of the Natural Environment," whose Article 50, Point 3 prohibits the importation of radioactive waste and materials from other states for purposes of storage and burial unless an international treaty concluded by the Russian Federation lays down other rules (Article 93).

The Russian Federation president's Edict No. 472 "On the Russian Federation's Fulfillment of Intergovernmental Agreements on Cooperation in Constructing Nuclear Electric Power Stations Abroad" appeared in April 1993 for the purpose of resolving questions relating to previously concluded treaties. The edict confirmed (Point 1) Russia's fulfillment of the USSR's obligations under intergovernmental agreements on cooperation in constructing nuclear electric power stations abroad concluded prior to 1991, including in the sphere of the delivery of nuclear fuel and the return of spent fuel from these nuclear electric power stations to Russia for processing, entrusted (Point 2) the Russian Ministry of Atomic Energy, Ministry of the Environment and Natural Resources, Ministry of Foreign Economic Relations, Ministry of Foreign Affairs, and Federal Inspectorate for Nuclear and Radiation Safety with drawing up and approving the procedure for accepting spent nuclear fuel from foreign nuclear electric power stations for subsequent processing at Russian enterprises, and also instructed the Russian Ministry of Atomic Energy and Ministry of Foreign Economic Relations (Point 4), when concluding corresponding contracts with foreign clients,



to proceed from the premise of the preferential return to the client country of the solidified radioactive waste formed during processing.

The "Procedure for Accepting Spent Nuclear Fuel from Foreign Countries' Nuclear Electric Power Stations," agreed with all the aforesaid departments, was drawn up and approved in 1992 in full accordance with the edict. It is of fundamental importance to emphasize that the edict enshrined the legal possibility of making exceptions from the general rule for the Russian Ministry of Atomic Energy and Ministry of Foreign Economic Relations in respect of the return of solidified radioactive waste to the client. Thus, such an exception was agreed when spent nuclear fuel was imported from Hungary in 1993 in connection with the Hungarian prime minister's appeal to the chairman of the Russian Federation Government with regard to the critical situation concerning fuel at the "Paks" Nuclear Electric Power Station. The Russian Federation's refusal to accept the said materials would be a violation of our obligations, particularly the July 1986 contracts concluded with the "Paks" Nuclear Electric Power Station on the basis of the USSR Government's decree. Such actions would undermine Russia's international authority as a reliable partner which strictly fulfills the international obligations assumed prior to 1991 and would contribute to the loss of an important East European market for our industry.

Wherever our country has helped to construct nuclear electric power stations (the CEMA countries of East Europe and Finland), Soviet plans have been employed in respect both of the use of fresh fuel and of the return of spent fuel to the USSR for processing, pursuing, inter alia, the aims of the Treaty on the Nonproliferation of Nuclear Technologies.

It must be borne in mind that Western firms (Westinghouse, Siemens, EDF, and others) are today actively offering their services in the construction and modernization of nuclear electric power stations and deliveries of nuclear fuel, actively squeezing Russia out of the East European market for nuclear fuel.

It should be pointed out that Britain and France also offer extensive services in processing spent nuclear fuel to other countries (chiefly West European ones). France also carries out large volumes of work on processing such fuel under a contract with Japan.

During the processing of spent fuel, isotopes of uranium and plutonium are extracted for subsequent use in nuclear power generation, while waste from processing is vitrified and put into lengthy storage. This technology has been developed and introduced in our country to ensure the work of all nuclear electric power stations with reactors of the VVER-440 [water-cooled, water-moderated power reactor] type constructed by us prior to 1991, with due regard for modern demands with regard to protecting the health of personnel and protecting the environment.

The signed protocol to the 1966 agreement confirms the economic relations which took shape between Russia and Hungary prior to 1991 and does not run counter to Russian legislation or the Russian Federation president's Edict No. 472 of 21 April 1993, and all the necessary procedures were observed in its preparation, including agreeing it with the region in accordance with Article 9 of the Law "On Protection of the Natural Environment." It ensures the protection of Russia's economic and political interests in East Europe and makes it possible, inter alia, to resolve the problem of rehabilitating territories polluted by industrial activity in the past and of implementing the program for handling radioactive waste.

Therefore all attempts to cast doubt on the Russian Federation Government's decision are unfounded and have nothing in common with Russia's interests apart from the desire alone to politicize the situation in the country.

### **Aftermath of Chernobyl Still Experienced in Many Cities**

*LD1304151594 Moscow ITAR-TASS in English  
1315 GMT 13 Apr 94*

[Report by ITAR-TASS correspondent Mikhail Karlov]

[Text] Moscow April 13 TASS—"Grave indications of serious medical aftermaths, caused by the irradiation of human beings, have appeared eight years after the Chernobyl disaster," ITAR-TASS was told today by staff members of the Medical Radiology Research Centre of the Russian Academy of Medical Sciences.

As many as 517 people, afflicted by radiation, were found in 58 Russian cities, including Novgorod, Izhevsk, Elista, Kurgan, Novosibirsk, Omsk, and Khabarovsk. But the Chernobyl zone of contamination remains most threatening. It embraces 17 regions of Russia with a total population of more than two millions. Some children were found to be suffering from cancer of the thyroid gland in those areas. In normal conditions there are only a few cases of this ailment per million of children. Today, the incidence of this terrible disease has increased more than 20-fold in Gomel and Bryansk regions. Specialists forecast a sharp growth of this disease in Kaluga, Tula, and Oryol regions.

But Chernobyl is not the only danger zone in Russia. The second vast area of contamination is the southern part of the Urals. Several accidents there have been contaminated with strontium-90 radionuclides in an area of 2,000 square kilometres, inhabited by 300,000 people. 125,000 more people were irradiated by discharges of radioactive wastes into local rivers.

The third territory is in the southern part of Siberia, contaminated by the fallout of nuclear tests on the Semipalatinsk testing ground, where 467 nuclear devices were touched off in the course of fourteen years. Loyal to their "internationalist duty", Soviet servicemen carried out nuclear bomb tests only on days when the wind was

blowing from China towards Altay territory, Kemerovo, Orenburg, and Novosibirsk regions. The population of those areas is now consuming contaminated meat and milk. Due to the deteriorating economic situation, people are beginning to fish and hunt intensively in contaminated woods. They are also consuming wild mushrooms and berries, picked in contaminated forests and meadows.

New methods of measuring the "average doses" of irradiation were developed during the period that has elapsed since the Chernobyl disaster. Measuring "average" doses in populated localities is the same as measuring the "average temperature" of patients in a hospital ward. Even in populated localities, where the "average dose" is normal, there will always be people with large doses of irradiation, making up the principal risk group.

Millions of people have suffered through the fault of the state. This is why the state must fulfill its commitment to lower to the maximum the consequences of contamination. But the Finance Ministry is now planning to sharply reduce or stop the allocation of funds for the Chernobyl programme. This will accelerate the already looming extinction of the nation's gene pool.

#### **Russian Waste Not Raising Radiation in Sea of Japan**

*LD1804130794 Moscow ITAR-TASS in English  
1233 GMT 18 Apr 94*

[Report by ITAR-TASS diplomatic correspondent Nikolay Geronin]

[Text] Moscow April 18 ITAR-TASS—The area of the Sea of Japan in which the Russian Pacific Fleet dumped some of its radioactive wastes does not show above-normal levels of radioactivity, according to preliminary data released by a joint Russian-japanese-South Korean expedition which just finished studying the area.

Russian Naval Captain Gennadiy Vorobyev, deputy head of the radiation and chemical security department, told ITAR-TASS on Monday that during the month-long expedition, Russian, Japanese and South Korean scientists took samples of sea water from their base onboard the research ship "Okean", which belongs to the Russian federal hydrometeorology and environmental monitoring service.

The expedition's work was prompted by the worries of several countries in the region that the dumping of radioactive materials in the Sea of Japan by the Russian Pacific Fleet in October, 1993, might lead to higher radiation levels.

#### **Widespread Radioactive Contamination Reported in Tomsk Area**

*LD1604155994 Moscow INTERFAX in English  
1251 GMT 16 Apr 94*

[Text] The radioactive situation in the Tomsk region, where the Siberian chemical plant is situated, is very complex; several territories are contaminated with Plutonium-239 and 240 as a result of numerous discharges from this enterprise, Marina Khotuleva, expert of the Radioecological Research Center of the Social-ecological union, declared to Interfax.

In her words, contamination of territories located nearby the Siberian chemical plant in Tomsk-7 exceeds the background contamination several times, in some places it is 3000 becquerels per sq.meter.

"Discharges of radioactive water from the plant into the Tom river have resulted in its contamination with radionuclides Cobalt-60, Zinc-65, Manganese-54," said Khotuleva.

As she said, the Radioecological Research Center conducted an independent investigation of the consequences of the accident at the Siberian chemical plant which occurred on April 6, 1993 and found out that the territory was additionally contaminated with a short life cycle radionuclides, Ruthenium-103, Niobium-95, and Cerium-144.

Ecologists are concerned over the fact that liquid radioactive wastes are being pumped into the underground water layers for storage for a long time already.

As Khotuleva declared, a total of 40 Mn cubic meters of liquid wastes, including those which contain plutonium have been pumped under the ground since early fifties till now. "Nobody can rule out possibility that these radioactive materials can appear in reservoirs and in water supply systems intended for drinking," said she.

#### **Military Works out Environmental Defense for Russian North**

*LD1804101294 Moscow ITAR-TASS in English  
0934 GMT 18 Apr 94*

[By ITAR-TASS special correspondent Anatoliy Yurkin]

[Text] Mirnyy (Arkhangelsk region) April 18 TASS—A programme for the environmental defence of the Russian north has been worked out by scientists working with the state strategic missile testing complex. The programme allows the military to estimate the damage caused to the environment by missile fuel and other harmful things, and to decrease the amount of damage caused to nature along the missiles' flight path.

"600 rocket and rocket-carrier launchings have been made in the last ten years. That is what forced us to start

researching environmental problems", ITAR-TASS was told by Colonel Viktor Omelchenko, head of the testing area's computer centre.

The programme was worked out by the testing area's leading specialists and is a data and reference system which shows which areas are most subject to damage and the various levels of pollution. On the basis of such statistics, conclusions may be drawn and certain steps undertaken. The programme is unique, since it is concentrated on a concrete area, the environmentally fragile Russian north.

According to Omelchenko, Russian cooperation with American military scientists has led to great interest in the latter's missile-related environmental programme, which has been thoroughly worked out.

The United States programme's starting theses are significantly different from the Russian ones. For example, the flight trajectory of missiles and missile-launchers goes over the Pacific Ocean. However, the two countries' cooperation in this sphere is still very helpful.

"The programme which we have created is the first step to the development of an environmental monitoring system to keep track of the situation as it develops", stressed Colonel Omelchenko.

#### **Program To Attract Students to Ecological Studies Considered**

94WN0247A Moscow *RABOCHAYA TRIBUNA*  
in Russian 1 Apr 94 p 6

[Interview with Prof. Kirill Pavlovich Stayev, conducted by Mikhail Dmitruk: "The Poor Little Princess Bit the Poisoned Apple"]

[Text] *And why? Because the beauty in Pushkin's famous fairy tale had never had "ecological literacy" training. Incidentally, that subject, one pertaining to environmental protection, may soon be studied by Russia's school children and vocational students.*

*Adults keep on polluting the environment as if they had no children, and as if they themselves would live forever. Clearly the next generation will have to save itself. And adults are already prepared to give it that chance. Recently a joint board meeting of two Russian ministries—education and environmental protection—approved a draft resolution on recruitment of school children in ecological studies. Our science correspondent discussed this new and extremely important undertaking with Professor Kirill Pavlovich Stayev, State Prize laureate, who helped prepare the resolution.*

**Stayev:** One of the main reasons for the thoughtless attitude toward nature is the lack of ecological culture in Russia. It needs to be taught in school, or else it will be too late. But ecology should not be a separate subject, but rather a leitmotiv for all disciplines, because the most

important issue facing humanity today is the struggle for survival in a poisoned environment.

**Dmitruk:** Why frighten school children with the "environmental ulcers" that have been uncovered virtually everywhere in Russia? If they learn of these things at a tender age they might be psychologically traumatized, and children's health has been undermined by environmental pollution as it is.

**Stayev:** The mass media are no longer concealing the scale of environmental disaster in Russia—and children are aware of it, too. But in the hunt for sensational material many journalists like to spend their time uncovering environmental crimes and talk very little about how to deal with their consequences. Most often children are psychologically traumatized because they do not know how they are going to survive in a poisoned environment. By teaching them that, we eliminate both destructive factors, both the psychological and the physical.

**Dmitruk:** Is that really possible in today's Russia?

**Stayev:** It is becoming possible. By a joint decision of the Ministry of Environmental Protection and Natural Resources and the Ministry of Education, ecology lessons are being introduced in secondary schools and vocational schools. These lessons are to be taught by instructors in biology, physics, chemistry and other subjects. Through practical exercises the children will learn about hazards to the environment so they will be aware of how to subsequently clean up various pollutants.

**Dmitruk:** But should that not be done by the adults who work for Ministry of Environmental Protection agencies and the public health service?

**Stayev:** Even school children know how well they are coping with their jobs. Those agencies are chronically short of people and money. Therefore even Russia's "environmental ulcers"—places like Norilsk, Chelyabinsk, Plesetsk and many other "environmental disaster areas"—have not been thoroughly studied, much less cleaned up. But things that underpowered organizations are not capable of doing can be accomplished by millions of Russian school children and vocational school students.

**Dmitruk:** That tremendous force can be utilized free of charge under the banner of struggle for survival. But lots of money will be needed for instruments, reagents and cleaning agents for laboratory studies. Where will that money come from?

**Stayev:** By decision of the two ministries it has been recommended that regional environmental organs and ecological funds allocate up to five percent of their total annual funding to support environmental education.

**Dmitruk:** Excuse me, but in Russia not even laws are always complied with, so mere recommendations from two impoverished ministries can simply be ignored if it



is not advantageous to comply. What advantages can there be from environmental education?

**Stayev:** Very major ones, because environmental protection organs' funding is derived mainly from fines imposed on enterprises that pollute the environment. The more polluters the kids expose, the more fines professional defenders of nature will collect. The benefit will probably be several times greater than the five percent of funding that we recommend be allocated for environmental education.

**Dmitruk:** But if this idea takes off, the mafia structures that are now pocketing the money allocated by the state for environmental protection are not likely to be too happy about it. And might not the heads of enterprises that are violating environmental protection law, to put it mildly, drop students a "hint" that they should stop any studies that might bring on scandals and fines?

**Stayev:** Today there is nothing more important for the next generation than environmental protection. If young people do not protect the environment, soon irreversible processes in the biosphere capable of destroying every living thing could begin. There can be no compromise on this point: either we die out, or we save nature and ourselves.

We cannot sit idly by while every living thing dies. It is not possible to halt this extinction without heroism and self-sacrifice, and we must prepare young people for that.

Right now they are being taught to take really pointless risks. For example, Western movies are cultivating extreme individualism, depravity and cruelty—that is about how to kill, not save. A majority of children and teenagers get no other training: the Pioneer organization is gone for good, and the Boy Scout movement is in its infancy. Kids cannot find a larger positive cause to unite them. The struggle to save their Fatherland from ecological disaster could be that cause. That struggle would fill teenagers' lives with profound meaning, a spirit of collectivism and noble romanticism.

**Dmitruk:** It is not likely that pretty words will inspire today's teenagers to undertake selfless labor, even for the sake of saving everyone, because in recent years they have been taught to seek instant material gratification in all things.

**Stayev:** And that is what we are offering kids. Through ecology lessons they would find out about the extent of pollution and method of decontaminating the food products they buy in stores with their parents, buy at markets or grow in their own garden plots. They would test sites to determine soil acidity, water hardness and background radiation, and then bring them down to normal levels. The knowledge and skills learned by students could be passed on to their parents and to their grandparents. The older generation should have a keen interest in their kids getting environmental training.

I am referring not only to parents, but also to the heads of enterprises. A majority of enterprises are going to be privatized, and a good manager is always interested in the health of his employees.

**Dmitruk:** In the West it has long been calculated like this: one dollar invested in environmental protection yields an eightfold profit.

**Stayev:** Yes, and therefore it will be very much to an enterprise manager's benefit to hire graduates who have environmental training: they will look out for their health and for the environment. Even now owners of enterprises should be interested in environmental training at the schools and vocational schools from which they get new personnel. A farsighted manager could sponsor that effort, with benefit for himself as well.

Enterprises used to become patrons of local educational institutions on orders from above. But prudent enterprise owners will voluntarily be patrons of economic [sic] education in general schools and vocational schools that will in the future yield for them greater savings in fines paid to environmental protection agencies and in sick days for their employees.

#### Health Consequences of Chelyabinsk Nuclear Testing, Accidents Viewed

94WN0238A Kiev ZELENYY SVIT in Ukrainian No 4, Mar 94 p 5

[Letter by Svitlana Ihorivna Luchyts, co-chairman, Democratic Green Party of Chelyabinsk Oblast: "I Want To Tell You About the Chelyabinsk Tragedy"]

[Text] Ukrainian People's Deputy Volodymyr Yavorivskyy quite recently received a letter which related the fate suffered by the hostages of the "Urals Chernobyl"—the Mayak Industrial Combine. Volodymyr Oleksandrovykh conveyed this letter to our newspaper, as its author had requested. We offer it here for your attention.

Dear fellow-countrymen!

I am writing to you from the distant Ural city of Chelyabinsk. I was born near Kherson, studied at Odessa University, worked for 11 years at the Odessa Polytechnical Institute, and I have been here for 26 years—at the Chelyabinsk Technical University.

My older children and grandchildren are Ukrainians, whereas my younger daughter is Russian; I have brothers and sisters living in Kiev, Kherson, Odessa, and Moscow. Both Ukrainian and Russian cultures are near and dear to me. In my soul and in my consciousness Russians and Ukrainians are fraternal peoples.

I want to tell you about the Chelyabinsk tragedy so that you may know what is menacing you.

Some 45 years ago in this short-lived "Ural Switzerland" an enterprise began to be built for the purpose of making an atom bomb. The best minds of our nation were

brought here, and they worked self-sacrificingly, believing in the need to create an atomic shield for our Fatherland. This plant was built in record time.

But the technology of radiation safety was still at a very low level at that time. Plutonium was carried about in glass vessels, adulterated radioactive wastes were poured into the small Techa River, on the bank of which the "Mayak" Chemical Combine was situated. That came to be the name of the production association which produced nuclear weapons.

Thousands of nuclear specialists and service personnel perished during the first few years of Mayak's operation, and nobody has ever counted the number of people living around there who also were lost.

Finally the authorities came to their senses and began to resettle people away from the river. They fenced it about with barbed wire and prohibited people from drinking its water, bathing in it, or watering their cattle in it. But for many years they did not explain to people the reason for these prohibitions. And people used to drink contaminated milk, eat vegetables from cities which used water from the Techa for irrigation purposes, and they continued to bathe in this river.

The average life expectancy declined to 40 years. And these could not really be called lives. Everyone's bones hurt, they had headaches, they were weak, and suffered from bleeding. And in the town of Ozersk (Chelyabinsk-65) more and more children came into the world with birth defects. Whereas in 1955 these amounted to 10-11 per 1000 births, in 1988 this indicator stood at 22 per 1000 births.

Another misfortune was that the medical personnel were forbidden to make correct diagnoses. This was a state secret. The physicians had to sign an agreement not to divulge their diagnoses. How many tragedies could have been averted if it had not been for this anti-humane decree or regulation!

In 1957 there was an explosion at a tank in which diluted radioactive wastes (RAO) were being stored for safe-keeping. As a result of this rupture, a trail 105 km long and 8-10 km in width was created. The fate of the persons who happened to be on the territory of this radioactive trail was tragic. Without any explanations of the reasons for this, all such persons were herded into barracks; their clothing and personal effects were burned, and they were given different clothing. A ditch was dug, and bulldozers were used to jump everything in it together with the cattle and bury the whole lot. The people were hauled away and resettled in temporary buildings. And then they were forgotten.

The third significant accident at the Mayak Chemical Combine occurred in 1967. After the toxification of the Techa people began pouring RAO into man-made or natural lakes. In one such lake, in Karachay, RAO accumulated having an activity factor of 600 million

Curie units (12 times greater than the amount emitted at the time of the Chernobyl disaster).

The summer of 1967 was a scorcher. The Karachay grew very shallow; the banks became denuded; the radioactive algae and mud dried up and turned into dust. The wind raised this lethal dust and carried it out about over an area inhabited by close to a half a million people.

Small or modest-sized accidents which occur—in the specialists' words—within the "regulated system" (that is, with discharges less than the allowable parameters) happen all the time and with great frequency. Thus, for example, on 17 July of last year there occurred a discharge at one subdivision of the Mayak Chemical Combine; and a slurry pipeline burst on 4 August.

The authorities reassure us that such discharges are less than the parameters of the allowable norms, but we doubt that the grounds justifying these norms are adequate. Furthermore, their frequency is so great that the sum-total turns out to be significant.

The swamps and ground waters of our oblast contain a total RAO having an activity of 1 billion, 300 million Curie units (equivalent to approximately 26 Chernobyls). There are 935 persons here who are ill with radiation sickness. Our hematology units at the local treatment facility are completely filled with sick children; 80 percent of them will die, and their places will be taken by others.

The nuclear shield of the Fatherland not only protects but also kills people. The military-industrial complex throughout the world is guided solely by its own departmental interests, as well as by the desire to preserve and safeguard its own scientific potential, its own privileged position, the existence of "closed" cities, and so forth. But these interests do not coincide with those of people in general.

We consider that nuclear production—including nuclear electric-power engineering—is leading us to destruction. We must re-orient ourselves as rapidly as possible to alternative energy sources. For gigantomania will utterly ruin us.

## BELARUS

### Use of Russian-Vacated Land 'Complicated' by Radiation

WS2004135094 Minsk SVABODA in Belarusian  
12-18 Apr 94 p 3

[Report by SIM: "Russian Troops Left Their Bases and Radiation"—first paragraph published in boldface]

[Text] The ecological problems of disarmament will be discussed at a planned seminar at Narach lake under the auspices of the Belarusian Defense Ministry, the State Committee for Ecology, and the Belarusian Academy of Sciences.

An area of more than 4.5 million hectares has been vacated after the withdrawal of certain units of the Russian Strategic Missile Forces. Use of this land, however, has been complicated by the fact that increased radiation has been observed at numerous sites. For example, in Marina Horka—one of the Russian units' bases—the level of radiation exceeds the norm by 10 times. There have been reports that radioactive emitters, which were used for didactical purposes, were stored here. The lack of controls and natural aging of the emitters have led to the increased radiation levels. At Rechytsa, a radioactive waste dump which has been handed over to the Belarusian Interior Ministry, radiation is detectable within 200 meters of the perimeter. Since the dumping ground is located in an unprotected forest area, the local citizens—unaware of any danger—are taking advantage of nature's bounty there.

## UKRAINE

### IAEA Experts Document 'Numerous Shortcomings' in Chernobyl

WS1104154394 Kiev KYIVSKA PRAVDA  
in Ukrainian 8 Apr 94 p 1

[Unattributed report: "'International Safety Regulations Are Not Met,' IAEA Experts Said"]

[Text] According to an agreement with COMPETENT Ukrainian agencies, a group of experts for the International Atomic Energy Agency [IAEA] worked for two weeks at the Chernobyl nuclear power plant. Certain well-informed sources, preferring to remain anonymous, sent our newspaper the text of a letter by IAEA Director Hans Blix to Ukrainian President Leonid Kravchuk summarizing the results of the work done by the experts of his organization. We have the opportunity to acquaint our readers with almost the full text of this letter that is of great interest. Here it is (the original style is preserved):

"...documented were numerous shortcomings in ensuring safety at the operational nuclear units. Particular concern is aroused by specific problems connected with the obsolete design of the old-type No. 1 reactor that are still waiting to be resolved...

"Experts have also pointed to a number of factors that, when combined, effect the overall safety situation. Difficult work conditions and a substantial steady drain of qualified professionals represent a big problem. In addition, a limited possibility to purchase common equipment results in a deficiency of necessary spare parts.

"The most serious problem established by the experts is the accelerated deterioration of the 'Shelter' at the No. 4 reactor unit. The destruction of this unit, if it were to take place, would complicate safety conditions of operational units and produce grave ecological consequences.

"Although fully aware of the magnitude of the economic crisis that Ukraine confronts, I consider it my duty to bring to your attention that international safety norms are currently not met in Chernobyl. Given the graveness of the present situation, you might want to convene a meeting with the concerned countries to discuss what measures could be taken to improve the situation..."

### Toxic Waste Continues To Be Dumped in Country

AU0804193994 Kiev HOLOS UKRAYINY in Ukrainian  
2 Apr 94 p 2

[Article by Bohdan Bereketa, HOLOS UKRAYINY correspondent: "...All Traces Have Been Buried in the Bunker"]

[Text] An extraordinary event took place in Lutsk. It was only recently that local authorities found out that, since September 1993, unspecified chemical substances have been lying about on the territory of the city (a few meters away from the Styr River). They had been brought in by the Polish firm "Midas." There are more than 10 tonnes of them in 194 barrels. The cargo had been sent to the local scientific and production society "Industriya-T Ltd." The cargo arrived without a proper contract, specifications, or certificate.

"To this day, nobody knows through which Customs post these chemical substances got to Volyn Oblast," oblast chief of the State Administration for Environmental Protection Rostyslav Mihas said indignantly. "One has an impression that they have fallen from the sky. Even a commodity-transportation invoice is missing."

Very much about it is a mystery. General director of the "Industriya-T Ltd" Yevhen Lebed maintains that he has no business relations with the Polish firm "Midas."

"We have a contract with the 'Doris' firm in Wlodawa," said Yevhen Oleksandrovych. "The Poles owe us a few thousand U.S. dollars. We agreed by telephone that, for these dollars, they would send us dyes and varnishes.... As for the firm "Midas," I don't know anything."

I would like to believe that this is the case. However, the "commodity" had been stored for one-half year on the "Industriya-T Ltd" premises. Without corresponding documents. It is still unknown what substances are within the barrels. Much later, some unofficial papers in German arrived from Poland. If one is to believe the text, the barrels contain dangerous substances, which decompose upon contact with water, acid, or carbon dioxide and may produce toxic hydrocyanic acid. According to R. Mihas, there is a suspicion that this cargo arrived from another country, but via Poland.

When local authorities found out what kind of "commodity" it was, they decided to immediately take it away from the city. The Civil Defense headquarters, the Sanitary Service, and the militia offered their help, and the Procurator's Office started looking into the case....



The chemical substances were transported to the territory of a former military unit and buried in the bunker of the former command post. Again a violation. The military property had been transferred to the collective agricultural enterprise "Ukrayina" in Kivertsy Rayon. However, not only wasn't the farm's leadership asked permission, but it was not even notified [about the chemicals]. Of course, the local residents are upset, as some of them work there.

Deputy chairman of the Volyn state administration Andriy Chumachenko said that a letter had been sent to corresponding Polish services with a request to locate the owner of the unknown chemicals. The answer was as follows: "'Pan [Mr.] manager' is under 'criminal' investigation."

Does the "Midas" firm exist at all?

This is how we live. It has already been some time since waste products in the guise of raw materials have been delivered from Germany to the Lutsk plastic wares plant. Take what we don't need. This is done without any authorization on the part of environmental protection bodies. The enterprise cannot reprocess this garbage, yet it continues to arrive. Almost 130 tonnes of German waste products are buried on the territory of the plant. Another 40 tonnes are still lying about....Volyn Oblast.

#### Editorial Note

On 28 March 1994, with a mutual agreement by representatives of more than 100 countries that are signatories to the Basel Convention, a total ban was adopted on exporting dangerous waste products (including exports of waste products for reprocessing) from developed countries to developing ones and to countries of Eastern Europe and the CIS.

Today, 98 percent of waste products of various industries accumulate precisely in 24 most advanced countries of the world—from now on they will have to deal with that junk on their own.

It is true, though, that Ukraine has not yet joined the Basel Convention. That is why it is being used as a dumping ground.

#### Dnieper's Radioactive Contamination Assessed

AU1304111494 Kiev DEMOKRATYCHNA UKRAYINA  
in Ukrainian 7 Apr 94 p 2

[Article by Mykhaylo Kuzmenko, head of the Department of Radioecology at the Ukrainian Academy of Sciences Hydrobiological Institute: "How Do You Feel, Dnieper?"]

[Text] The fate of the Dnieper River is in the fate of Ukraine. The fate of Ukraine is in the fate of the Dnieper River. From times immemorial, the Dnieper has been a source of livelihood, a defender, and a savior for the people who lived in its valley. Its banks became a cradle

for the Ukrainian nation and for the first human cereal-growing civilization—the Trypillya culture. The genius of Ukraine's great son T.G. Shevchenko matured and derived inspiration on the banks of the Dnieper. The immortal bard found his last refuge there, too....

For the majority of Ukraine's population—35 million persons—the Dnieper continues to be the indispensable source of drinking water; it satisfies the needs of industry and irrigated agriculture; it is also used as an economic transport line. Not to mention the Dnieper's significance for the spiritual world of the people as a source for literary and artistic creativity!

Throughout its age-old history, the Slavutych [a poetic name for the Dnieper] repeatedly suffered enfeebling droughts and destructive floods. However, recent decades have become particularly ominous for the great river. The epoch of hydrological construction culminated in the creation of six water reservoirs: Kiev, Kaniv, Kremenchuk, Dniprodzerzhynsk, Zaporizhzhya, and Kakhovka. The semi-flowing water reservoirs, created in the flat-country river, have lost their eternal purity and the life-giving properties of the Dnieper water. The yearly mass development of blue-green algae—the algal bloom, the formation of slime, the swamping of huge shallow-water areas, the chemical pollution, and, as a result, the sharp deterioration of the biological quality of the water—this is a very incomplete list of afflictions suffered by Ukraine's life-giving artery.

Great changes have taken place in the qualitative composition of the ichthyofauna; valuable species of fish—sturgeon, pike, and carp—have disappeared or decreased in number, whereas fish of inferior value, such as clupeids, gudgeon, or rudd, have multiplied.

However, the Chernobyl nuclear tornado has introduced the most dreadful poison into the Dnieper. As a result of the accident, the natural ecosystems in the Dnieper Basin have also undergone wide-scale radioactive contamination. On the first days after the catastrophe, fragments of uranium fissure were driven by the wind in various directions and over huge distances away from the Chernobyl Atomic Electric Power Plant, contaminating woods, fields, water reservoirs and becoming deposited in plant and animal organisms.

Prior to the accident, the background content of radionuclides in the water of the Kiev Reservoir was as follows: strontium-90, between 0.00407 and 0.00682 becquerels per liter; cesium-137, between 0.00074 and 0.0037 becquerels per liter. The radioecological situation in the Dnieper and in its reservoirs largely took shape during the first weeks and months following the accident, when the content of radionuclides in the water reached between 0.04 and 1,332 becquerels per liter and up to 800,000 becquerels per kilogram of natural moisture content in bottom deposits.

Among the main tasks during the period that has passed after the accident there was work associated with the protection of water bodies, in particular, the building of

dams and traps on the path of the main flows of radionuclides and the fixation of soil in the areas of drainage. Despite the considerable expenditure and the large volume of work aimed at reducing the travel of radionuclides from the 30-kilometer zone, the escape of radionuclides to the Prypyat River, the Dnieper River, and its reservoirs could not be appreciably reduced.

For example, at the end of 1993, the content of radionuclides in the Kiev Water Reservoir was as follows: in bottom sediments, 26 becquerels per kilogram strontium-90 and 815 becquerels per kilogram cesium-137; in plants, respectively, 102 and 407; in mollusks, 138 and 195; and in fishes, 13 and 211. At the present stage, the radioecological situation in the Dnieper and its reservoirs remains unstable. The content of radionuclides in the water is between 10 and 20 and in aqueous organisms 30 to 1,500 times that prior to the accident. Some carnivorous fishes in the Kiev Reservoir were found to contain cesium-137 in quantities that were one and one-half times the permissible level established in 1993 by the National Commission for Radiation Protection.

#### **Conference Discusses Aspects of Nuclear Disarmament**

*AU1504123494 Kiev HOLOS UKRAYINY in Ukrainian 13 Apr 94 p 7*

[Natalya Filipchuk report: "The Road Has Been Chosen. How To Cover It?"—first paragraph published in boldface]

[Text] On 7 and 8 April, the conference "The Road Toward a Nonnuclear Future; Ecological Problems of Ukraine's Nonnuclear Status and Human Psychology" was held in Kiev in the Ukrainian Building for Economic and Scientific and Technological Knowledge.

The conference was largely sponsored by the Global and Regional Security Institute. The Ministry of Defense and the Ministry of Machine Building, Military-Industrial Complex, and Conversion organized it. Vice prime minister Valeriy Shmarov, who opened the conference, made the following comment upon the fact: "The Ministry of Defense is interested in new scientific developments as a consumer. The Ministry of Machine Building—as a contractor...." Regarding scientists, they also tried to specify their role in the future nuclear conversion and asked how long the information (partially published in the foreign press) that is essential for their elaborations, will be withheld from them. To this Shmarov replied: Foreign journalists know how to work and they always obtain the necessary information.

However, this strictly practical question sounded very routine against the background of the issues that were discussed at the esteemed academic gathering. Namely: political and legal aspects of nuclear disarmament; the development of programs for destroying nuclear missile weapons and ecological and economic problems of their implementation; how to prevent the spread of radiation through subsurface water; the safety of the population

residing near potentially hazardous facilities; the psychological syndrome that may afflict the liquidators of the accident at the Chernobyl Atomic Electric Power Plant in the future; social guarantees for servicemen from those military formations that will be disbanded. With regard to the latter, vice premier Shmarov said this: Seventy-five percent of all the capital allocated for the disarmament program (according to some tentative estimates, it is \$2.5 billion—N. F.), will, in all probability, be spent on the social protection of servicemen dismissed from military service, on finding new working places for unique specialists, and on reprofiling. Incidentally, on this particular issue, no common language was found with the U.S. side.

A considerable sum is also allocated for ensuring ecological aspects of nuclear disarmament. In the opinion of the majority of speakers, Ukraine must abandon the idea of accumulating nuclear waste on its territory and utilizing (which is extremely expensive) the radioactive fuel in the hope to later emerge onto the international market with newly produced uranium, something upon which some specialists insist. All the more so since this will be difficult to accomplish in the near future. In the next 15 years, Russia will supply uranium to the United States (500 tonnes, in accordance with an agreement). The conference, which was prepared at the highest level and at which interesting and, the main thing, realistic reports were delivered, proved that Ukraine has a chance to cover that road toward a nonnuclear future, but there will be many problems and shocks on that road.

#### **Official Welcomes Decision on Chernobyl**

*AU1804075994 Kiev DEMOKRATYCHNA UKRAYINA in Ukrainian 14 Apr 94 p 2*

[Unattributed report on a briefing held by the chairman of Ukraine's State Committee for Atomic Energy, Mykhaylo Umanets; place and date not given: "The Moratorium on Nuclear Power Stations Is a Headache for the State"—first paragraph published in boldface]

[Text] In winter, the entire population felt the shortage of energy. That we did not freeze to death is largely thanks to the concerted work of the AES [nuclear power station] collectives. In those months, they accounted for 40 percent of the total electricity produced in Ukraine. All together over the last year, AES's produced 75,238 million kilowatt/hours, or 33 percent of the total amount of electricity. Moreover, it costs half of that produced by conventional power stations. These figures were made public at a briefing held by the chairman of Ukraine's State Committee for Atomic Energy, Mykhaylo Umanets.

#### **Nuclear Power Engineering**

"We are pleased with the result," said Mykhaylo Umanets. "We have not let the country down, and this is what matters. Are we satisfied with the quality of our work? Safe operation is our quality. Accidents were prevented

from happening. It is true that there were 11 incidents, but, in accordance with the international scale of nuclear and radiation safety, they were rated as incidents of first and second degrees, which do not have in any unexpected consequences."

Mykhaylo Panteliyovych also regards the cancellation of the moratorium on the building of new power units, something that has undoubtedly opened up prospects to the industry, as a victory of common sense over political intrigue. A decision was also made to postpone the closure of the Chernobyl station. This will make it possible to prepare more thoroughly for its closure and, at the same time, have economic advantages. The station will continue to produce the electricity that we need so much for a few more years.

What all of this has cost us! Quite recently, the press brought to the public's attention the desperate "SOS" by the nuclear industry, which, while selling the cheapest electricity to the state, did not have money to purchase fuel because of customers' failure to pay for the energy; it also sounded the alarm that specialists are leaving Ukraine's AES's en masse. The reason is the lack of social protection and salaries, which are lower than those in Russia.

It appears that this alarm was heard. At any rate, the president issued an decree enabling nuclear specialists to resolve many of the burning problems by exporting some of the electricity. The fuel issue has also been taken off the agenda for several years. The stations will receive the fuel from Russia in exchange for nuclear warheads from strategic missiles.

Considerable changes for the better have also been achieved in raising the level of the stations' operational safety. Over recent years, hundreds of specialists have received training at nuclear stations in Western countries. Recently a simulator started working at the Zaporizhzhya AES, and operators of VVER-1,000 nuclear reactors will improve their qualifications with its help. The installation of a simulator presented to us by France will soon be completed at the Khmelnytsky AES.

Last year, for the first time, the Sevastopol Naval Institute admitted two groups of students to specialize in servicing AES's. The majority of the students are residents of towns with developed power engineering.

The price we have had to pay for the moratorium will long remain a pain. Incidentally, it has not yet been determined numerically in terms of money. However, it is known that, owing to those politicians who rose high in their careers on anti-nuclear wings, we have lost 4 billion pre-inflation rubles. It is precisely such funding that Ukraine did not receive from the Union budget, after it stopped work building units that were at a high level of readiness.

This moratorium has now been canceled. Some people have received political dividends from this and the state—a headache: Where, in our budget made up of holes, can we

get such astronomical sums? The sixth unit of the Zaporizhzhya AES has to be commissioned this year. The second unit of the Khmelnytsky and the fourth of the Rivne stations must be commissioned in 1996.

Nor will it be simple to fulfill this program in view of the fact that the construction and assembly collectives have, in fact, deserted the stations. Only superb specialists can and have the right to build such facilities. However, not even these problems are a matter of the greatest concern for departmental heads. Given our political situation, the lack of clarity is quite disturbing. Where are the guarantees that the new parliament will not pass a law on a new moratorium? Decisions to open or close the Chernobyl AES have been made five times. Despite everything, specialists are already looking to the future: the construction of new-generation fast-neutron power units, which are more economical and more reliable. Canadian, U.S., French, and Japanese specialists are offering their designs.

We have our own scientifically substantiated concept on developing the industry under the headline of creating our own nuclear cycle in Ukraine. Of course, it is an expensive undertaking. However, it is worth the huge outlays, because not only is it economically advantageous, but also politically expedient, pointed out Mykhaylo Umanets.

"At present, fuel accounts for 64 percent of the cost of the electricity produced by the nuclear stations," he reasoned. "Calculations have shown that this percentage could be halved, if we did not have to purchase that fuel abroad, considering that Ukraine is already capable of extracting and enriching uranium ore to a concentration of natural uranium. We send this ore to Russian enterprises where the fuel elements are manufactured. We also send zirconium there, from which the holders for the cassettes are made. Incidentally, Ukraine used to have a monopoly on the extraction and production of zirconium within the USSR. Since we possess it and have specialists at the Ukrainian Academy of Sciences who may ensure the scientific implementation of the project, we simply have no moral right not to use such a potential in the interests of our own state. These outlays will eventually be returned a hundredfold. Ukraine could lose its independence if it continues to receive energy from neighboring states, which often use it to put pressure on us.

#### **Health Consequences of Mariopol's Environmental Contamination Viewed**

*944K1024A Kiev ZELENYY SVIT in Ukrainian No 4,  
Mar 94 p 3*

[Article by O. Kharlamenko, head of the Mariopol PZU (Green Party of Ukraine) Club, and L. Olshevskyy, member of the ZELENYY SVIT UEA (Ukrainian Eco-defenceinform Agency): "Why Are There So Few Happy Families in Mariopol?"]



[Text] During the first quarter of last year 800 marriages were registered in Mariopol, whereas 764 divorces were registered during this same period. According to data from a sociological poll conducted by a civic organization here, the principal reason for such "family" instability is the infertility and impotence of this city's human population. These factors have reached 60 percent and 33 percent respectively.

However, even if a family in Mariopol has a "real man," that does not necessarily mean that such a family will add a third or fourth member. The rate of stillbirths and infant mortality before the age of one year during the period 1989-1991 varied between 45 percent and 50 percent. Thanks to modern-day medicine, this indicator declined to 26 percent in 1992. But this was specifically due to ultrasonic diagnostics and the interruption of pregnancy in cases where anomalies were discovered. And this was already after nature itself had made a choice: From 1989 through 1992 the number of miscarriages increased from 24 to 32 per 100 pregnancies.

Nor can those families in which an infant has arrived always be called happy. Of each 1000 children, 22 are born with birth defects (for the sake of comparison, in Simferopol this indicator stands at 8).

At a time when the birth rate is declining, the mortality rate is rising: During the first quarter of 1993 it increased by 25 percent in comparison with this same period in 1992. But what do births and deaths have in common? The connecting link here is a cancer-treatment facility which was built for 90 beds but which now has 220.

This situation is dreadful, but it can be explained. This city with its 540,000 inhabitants provides 35 percent of Ukraine's steel and 30 percent of Ukraine's sheet metal. Mariopol also produces 90 percent of all kinds of septic tanks, as well as equipment for metallurgical and ore-enriching complexes. It carries out contracts for the Ministry of Medium Machine Building, and—in addition—has a plant producing medical equipment, as well as very large construction enterprises. The Mariopol seaport is the biggest on the shores of the Sea of Azov. Its annual goods turnover amounts to 12 million tonnes. Plying the world's oceans are at least 100 ships of the Azov Shipping Company, which are registered in the Port of Mariopol.

And all these entities are gasping and spewing out terrible poisons. Two steel-smelting plants and one coal-tar chemical plant have become particularly old and

obsolete. This complex, which still bears the name of Illich, is regarded as the most modern and up-to-date in Ukraine. Among its production facilities, which extend around the city's outskirts, is an open-hearth shop with three furnaces having a capacity of 900 tonnes each and three others having a capacity of 650 tonnes each. It has these furnaces, but they lack any equipment for combatting the contaminants from them. During the last 30 years unsafe wastes discharged by these plants have accumulated in enormous quantities in bodies of water which are unsuitable for this purpose. Solid wastes alone, which include 75 percent iron compounds, 1 percent manganese compounds, and 1.2 percent zinc compounds, have accumulated to the extent of more than a million tonnes. People say that during the Soviet Union period the Japanese wanted to acquire all of these materials wholesale, but the Soviet government refused—saying that not a single gram of strategic raw material should be turned over to a potential enemy. And the adulterated wastes have been abandoned at two dump sites, from which sulfuric acid has already been leaking for many years now.

That which the people of Mariopol drink can hardly be termed "water." The small Northern Donets River, which constitutes the principal source of water here, is dreadfully polluted, and the purification station is not operating in accordance with the normative requirements. Its operators have been compelled to add more chlorine than provided for by the norms, but that still does not help the situation much because waste waters are seeping into the system.

At one time Mariopol was a health-resort area. But nowadays the beaches are closed down every year. Salmonella bacteria have been found near the waste-water discharge collectors on the beaches, and cholera bacteria have been found in the Kalchyk Stream, which winds its way through the city.

It is not an easy matter to track down all these bad things, all the more so in that there are only five inspectors on the staff of the Ministry for Environmental Protection's local administration. Efforts to reinforce them should not be impeded. It would also be a good idea to outfit them with up-to-date monitoring equipment. Only when a correct diagnosis has been made and effective monitoring controls set up will we be able to actually proceed to carry out plans providing for the development of alternative industrial sectors, the optimization and modernization of metallurgical enterprises, as well as putting new purification capacities into operation.

## DENMARK

### Baltic Area Pollution, Cleanup Effort Viewed

94WN0209A Copenhagen BERLINGSKE TIDENDE  
in Danish 28 Feb p II 1

[Article by Steen Voigt: "The Baltic Sea Begins on Land"]

[Text] The Baltic Sea is something we sing about during international matches at Parken, something we think about when Bornholm fishermen sell cod at Christiansborg Slotplads, or when a Swedish court is asked to find elusive solutions to bridge projects.

But the Baltic Sea is actually closer to us than that every day.

After all, it begins on land, in Danish wheat fields, in Swedish fields, in the Russian taiga, and in Czech and Polish mining and industrial regions.

Thousands of water sources—rivers, streams, and creeks—carry toxic substances from industry, unpurified waste water from towns, and nutritive salts from agriculture out into the sea.

Thus, protecting and restoring the unique natural resources of the Baltic Sea is naturally a matter of national importance not only in Denmark, but in all nations surrounding the 422,000 square meter saltwater sea.

Mobilization of the people is one of six points in a long-range plan of action developed by a special task force of the Helsinki Commission (HELCOM) to save the Baltic Sea.

This is also because environmental and nature-friendly thinking must gain understanding among the people, particularly in the formerly communist countries.

After all, it is mainly the local people who will have to pay for purification facilities and containers. In return, they will have better health, a better environment, and more plentiful nature.

### Hot Spots

The plan, which includes the years 1993 to 2010, will require total investments of over 130 billion kroner over the 18-year period. Of this amount, just under 80 billion will go directly toward a number of polluting "hot spots" such as industrial plants and cities that send untreated wastewater directly into the closest river.

Most of these "hot spots" are in Poland, the three Baltic countries, and the Russian cities of St. Petersburg and Kaliningrad. But investments will also be made deeper into Europe, in the Czech and Slovak Republics.

Air pollution, in the form of nitrogen compounds from constantly increasing auto emissions and from power

plants, is another significant cause of the ecological imbalance in the Baltic Sea.

Along with nutrient wastes from households and over-fertilized agricultural lands, this disturbs the ecological balance of the sea, resulting in algae growth, oxygen shortage, and the death of fish, bottom animals, and plants. In recent years, approximately one-fourth of the Baltic Sea has been affected by the death of plants and animals on the sea floor.

The plan points to three hot spots in Denmark.

Two of these are the Belt and Oresund, which are overburdened with nutrients from agriculture. The Danish clean water plan of 1988 was unable to remedy these situations.

The third involves the release of wastewater from Copenhagen into Oresund. During heavy rains, Copenhagen County's sewerage and treatment facilities still have insufficient capacity and untreated waste from the sewers is released directly into Oresund. County plans for the region include investments of a half to a billion kroner.

### Warnings

The HELCOM plan comes 25 years after the first serious alarms about the sorry condition of the Baltic Sea began to be sounded for the general public.

Troubled researchers reported finding environmental poisons such as PCB and DDT in Baltic Sea seals, fish, and birds. Driven by the UN's environmental conference in Stockholm in 1972, these concerns were translated into action, culminating on 22 March 1974.

At that time, at the invitation of Finland, the then seven Baltic Sea nations signed the Helsinki Convention on protecting the Baltic Sea environment. This was the first international agreement of its kind for regulating all pollution of the sea.

Since then, this convention and HELCOM have been the axis around which work involving nature and the environment in the Baltic Sea has turned. Through so-called recommendations, the commission has set guidelines for everything from permissible chemical emissions to environmentally sound harbor facilities for shipping traffic.

### Good Tempo

From the Finnish capital, where of course the commission has its headquarters, General Secretary Ulf Ehlin, a Swedish oceanographer, said that 20 years of work and cooperation had reduced pollution in the Baltic Sea.

It is difficult to say precisely where and how much, due to the poor data available from the beginning of this work from the Eastern countries during the Iron Curtain period.

But the general secretary pointed to the rapid effort against the environmental pollutants PCB and DDT,

which threatened several bird species and seals with extinction, as an extremely positive experience in this body of water, which stretches from the Gulf of Bothnia in the north to Skagen in the west.

"The situation has improved in many places and many aspects," Ehlin told BERLINGSKE TIDENDE.

One positive surprise is that even now over 20 billion kroner have been appropriated for investments.

This includes major investments in purification plants in East Germany as a result of reunification, which have raised this figure considerably. But Poland alone is responsible for just under a third of the total sum, and that is good news, according to Ehlin, who also points to Estonia and Lithuania.

Several Danish companies have made preliminary studies in connection with the plan of action and since the breakup of the East they have examined possible projects and delivered environmental technology and know-how to the Baltic nations and Poland, in particular, in cooperation with both Danish and local authorities.

Denmark has made direct investments in many environmental projects in the Eastern countries, through the environmental assistance program of the Environmental Affairs Ministry and, beginning this year, through environmentally related sector programs, such as in the energy and agriculture sectors. A total of 300 million kroner has been appropriated for the Eastern countries in 1994, which will benefit the Baltic Sea as well.

#### More in Addition

Private nature and environment organizations are also playing an important role in the restoration of the Baltic Sea. Greenpeace, the World Wildlife Foundation, and others were included in the commission's work at an early stage, receiving observer status at the meetings.

And in the formerly communist countries, grassroots movements have sprung up and they are working together with organizations and agencies in every way.

The World Wildlife Foundation, WWF, has been given responsibility for a key point in the plan, namely the restoration of important coastal wetlands and islands in the Baltic nations and Poland.

These areas have all been reclaimed and used for agriculture or abused with waste and pollution because they have not been considered important.

Since 1992 the chairman of the Helsinki Commission has been Fleming Otzen of the Environmental Board. He has been involved with work surrounding the convention for over 20 years.

He believes the Baltic Sea is in worse shape today than in 1974.

"Things had begun to go downhill at that time and you cannot reverse that trend with a convention. That is not possible. The destruction will continue for a number of years."

Since then, a lot has happened that no one thought of in 1974.

"Air pollution was incorrectly underestimated. And now there are all the nutrient salts that are the problem. The oxygen deficiency will continue until agriculture stops its overfertilization and until sewage is no longer emitted into the sea," he said.

Next Tuesday [1 March] Otzen will host the environmental ministers of the Baltic Sea nations at the 15th meeting of the convention, to celebrate its 20th anniversary.

But they will also evaluate the results of previous decisions, including the decision to reduce by half the emission of a long list of environmentally harmful substances into the Baltic Sea during the decade of 1985 to 1995.

This reduction by half will hardly be achieved, but they are working hard on the matter.

#### Environmental Protection Seen Weakened Under EU

94WN0208A Copenhagen INFORMATION in Danish  
10 Feb 94 p 7

[Article by Ole Vigant Ryborg: "Danish Skeleton in the Closet"]

[Text] Danish overevaluation of the merits of the environmental guarantee before the national referendum on the EC package in 1986 has in reality rendered the guarantee unusable for Denmark and weakens Denmark in negotiations on environment and health issues.

Health Minister Torben Lund has dusted off the environmental guarantee and has been advocating use of it in connection with the food-coloring directive. In other places—particularly in the central administration—there is very little enthusiasm for turning this kind of political leverage into a legal proceeding.

There was no hesitation in the voice of Prime Minister Poul Schluter when on 28 January 1986 he rose from his seat in the Folketing and ascended the podium:

"Many spokesmen have said: We wish to make our own decisions in the environmental sphere, and I well understand this. We will achieve this, and will achieve it in a better way than before.

"But now we will have a different system, a system that enables us to make our own national regulations. It is unprecedented in the EC for this to be acknowledged in EC law. It is incorporated into the treaty itself in Article 100 A."



The prime minister played his trump. At that point, it was just a month until the Danish people were to go to the polls and accept or reject the so-called EC package. The prime minister and his enthusiastically pro-EC foreign affairs minister had serious domestic problems. A majority of the Folketing was opposed to Danish acceptance of the "package." There were two parts to the EC package, in particular, that had caused a majority in the Folketing to urge a no vote. The first was the additional power the European Parliament would assume, and the other was the fear that the environment would take second place to harmonization of the inner market.

While the issue of the European Parliament's role was a very technical matter, the discussion around the so-called environmental guarantee evolved in 1985 into an orgy of Danish assurances about the guarantee's merits. The guarantees for Danish health and the future of the environment were touted within the Folketing, the Marketing Committee, in statements issued by the Foreign Affairs Ministry, and in commentary from the daily press. Yet, it is interesting to note that after eight years, it has never yet been "necessary" to invoke those guarantees. This despite obvious problems in the EC related to solvents, cancer-causing agents, and the most recent issue on food coloration. The cause: Nearly every case in which the environmental guarantee might be invoked provides an opportunity for exposure of the fact that the Danish interpretation of the environmental guarantee is not viable.

#### Negotiation Problems

It is not exactly a well-kept secret that Denmark employs a much wider interpretation of the use of the environmental guarantee than that laid down by the European Commission's legal services. Or compared to the other EU [European Union] nations. Even before the national referendum in February 1986, the question of Denmark's interpretation was raised and later discussed. One place it was discussed was at the conference held in Copenhagen in April 1987, in which the general directors of both the Council of Ministers and the Commission's legal services, Dewost and Ehlermann, clearly laid down a ruling that made the guarantee less usable than the Danish interpretation would have it.

The fact that there is a discrepancy in the interpretations is not unusual, but the very strict Danish interpretation of the environmental guarantee has ultimately become a problem for Denmark in the negotiations in Brussels.

A number of centrally placed Danish diplomats have admitted to INFORMATION that the Danish interpretation is a distinct inconvenience when Danish officials and ministers in Brussels must fight to maintain Danish standards on environmental and health issues. These officials argue that if those in Brussels could "threaten" the Commission with the idea that Denmark might invoke the environmental guarantee, such a threat could

influence the Commission to alter its proposals in a direction more favorable to Denmark.

#### Guarantee or Sop?

The basic difference in the interpretation of treaty Article 100 A, which contains the environmental guarantee, is largely a matter of the extent to which this article is a genuine guarantee for a better environment and the extent to which it is a kind of sop to those countries who are likely to vote against the directives on the inner market when they are put to a vote. In 1985/86, there was no question in the Danish mind that the article was a real guarantee.

"In those instances in which the uniform technical regulations do not adequately safeguard health, work environment, or the environment in general, a member nation may introduce national measures with the object of fulfilling this goal," Uffe Ellemann-Jensen, then foreign affairs minister, assured the Folketing on 28 January 1986. He was backed up by a number of statements issued by the Foreign Affairs Ministry in the period before the national election.

However, in at least four areas, the Danish interpretation of the guarantee diverges from the interpretation in other places. This concerns:

- Regulations established in committee procedures.
- The extent to which a nation must vote negatively in order to invoke the environmental guarantee.
- The extent to which a nation has the right to invoke the environmental guarantee for the purpose of introducing stricter regulations at a later date, after an EC regulation has already passed.
- Which party should bear the burden of proof when the EC Court is called upon to determine whether a nation may set higher standards for the environment and health.

#### Food Coloring

Of these, the final point is the crucial reason why Denmark on a number of occasions has refrained from invoking the environmental guarantee. Both in the case of warning labels for cancer-causing substances and in the present case of the so-called food-coloring directive, problems have arisen because there is disagreement among the technical experts on the inherent danger of the substance. While, in Denmark, it is regarded as a fact that a number of substances allowed by the directive are dangerous, a number of experts from other countries consider these substances to be harmless. Therefore, if Denmark is to invoke the environmental guarantee with any effect, a crucial question must be who would have the burden of proof if such a case should go before the EC Court. The European Commission does not hesitate in this matter. According to the Commission, the country that wishes to invoke the environmental guarantee has the burden of proof before the Court to substantiate its claim. The Danish interpretation is exactly the opposite.

"It is obvious that if the Court is to render an opinion on the allegation of misuse, it is incumbent upon the party bringing the complaint to substantiate it. The burden of proof on the member nations will as a result be lighter," wrote Kent Kirk, the current Conservative EU spokesman, in a commentary in *INFORMATION* on 24 February 1986.

Should Denmark invoke the environmental guarantee in conjunction with the food-coloring directive, the fact that Denmark overinterpreted the guarantee in 1986 would in all likelihood be revealed.

#### Freedom of Action

And, if at a later point, it could be shown that some of the substances that are now permitted by the food-coloring directive in Denmark were dangerous, it would not be possible to tighten up on Danish regulations by invoking the environmental guarantee without the risk of raising a conflict over interpretation.

"It must follow that even if the Council has passed joint regulations, a member state can retain more comprehensive pre-existing regulations; that a member state can choose directly at the time of passage and implementation of the EC regulation to impose stricter national regulations, or else choose in the first instance to utilize the joint regulations, but later—in light of developments—choose to tighten these through the use of national regulations," wrote the Foreign Affairs Ministry in a statement issued 30 January 1986.

Evidence that the Commission does not agree with this interpretation can be found, among other things, in an answer given by the Commission in the European Parliament on March 1987 to Else Hammerich, a member of the EC Parliament at that time.

One problem with the food-coloring directive is that, once the directive is passed, a special committee will continually revise the list of substances that are allowed or prohibited. In the debate on the directive, former Industry Minister Jan Trojborg has put a great deal of emphasis upon the fact that Denmark was able to insert a clause to the effect that in the period before the directive goes into effect this committee should evaluate a number of substances again. The Danish interpretation of the environmental guarantee suggests that Denmark could also avail itself of the environmental guarantee with regard to the committee's later work, while the Commission in its answer to Hammerich clearly said no to that kind of use of the guarantee. The EU Court has, as a result, decided that if Denmark wishes to invoke the environmental guarantee on the food-coloring directive, it must occur immediately after the passage of the directive.

The environmental guarantee has again been dusted off by, among others, Health Minister Torben Lund who has urged using it in connection with the food-coloring directive. But, in other places—especially in the central administration—there is very little enthusiasm for

turning this kind of political leverage into a legal proceeding. Denmark has too many potential skeletons in the closet for that.

#### Debate Continues Over Adopting EU Water-Quality Standards

94WN0208B Copenhagen *BERLINGSKE TIDENDE*  
in Danish 17 Feb 94 p 11

[Article by Pauli Andersen: "Clean Water"]

[Text] The European conception of clean drinking water will be profoundly challenged in coming years. The chemical industry and a number of EU [European Union] nations will permit drinking water to contain toxins, as long as it does not harm humans. Denmark has said no to more toxins in the waters. But Danish scientists maintain this position is unreasonable.

"Never drink water," said W.C. Fields, who would never have dreamed of mixing a drop of the stuff into his shot glass of whiskey.

The Danes were not listening. They drink several billion liters of it each year. All in good conscience. For, as long as there have been humans on this earth, clean groundwater has been a given as profound as life itself.

Yet, even as the second millennium is humming its final refrain, the conception of this pristine necessity of life has been challenged by something resembling the first bar of the virgin spring's swan song.

The threat arises from chemicals leached from old industrial sites and nitrates from the use of agricultural fertilizer. To this may be added new information about raw water that arrives at water purification plants polluted with pesticides. Denmark's Geological Survey (DGU) has just published this finding in a report on the state of the groundwater.

How great is the threat? Have they found quantities in the groundwater so minuscule they are incapable of causing harm? Is the perception of pollution in reality a deception perpetrated by instruments so sensitive they (to use a scientist's words) could measure Napoleon's urine production on an anxious morning at the front?

Can Denmark and Europe sacrifice with equanimity the principle of uncontaminated groundwater for the sake of maintaining our present-day intensive and industrialized agricultural operations? Or is the discovery of toxic sprays and nitrates in the groundwater so alarming that agriculture must accustom itself to the use of much less fertilizer and poisons?

That is a question that will occupy an important place on the EU agenda in the coming year.

#### Pressure on the EU

Billions and billions of kroner are at issue. The chemicals industry is afraid that restrictions on the use of pesticides

will cause their profits to plummet. And many governments in EU countries have so much difficulty in achieving the requirement of zero-contaminated groundwater that they are facing extraordinary expenditure for water purification, if the regulations are not relaxed.

It is estimated that 25 billion kroner will be used in Denmark over the course of 30 to 100 years for cleaning up old dump sites and industrial locales. Purification of water or the relocation of water wells because of the nitrate and pesticide content in reservoirs is expected to cost the society an additional billion.

Reflecting the concerns of agriculture, the economy, and the environment, the dilemma has taken the form of an assault upon two EU directives. A number of member countries are demanding that the regulations on certification of plant toxins and protection of the groundwater be relaxed. The main argument being advanced is that it is all right for groundwater to contain traces of pesticides when it is a question of harmless quantities.

Following an Irish initiative, the Belgian chairmanship shortly before Christmas made the proposal that the World Health Organization's water quality standards, rather than the principle of zero contamination, should be applied to pesticides in drinking water.

Ireland, Great Britain, France, Spain, and Belgium support this proposal. If they are to avoid billions in expenditure for purification, threshold values will have to be set at a level they can achieve, according to one of the main arguments.

The push for more relaxed regulations for pesticides in drinking water has come at a time when the EU's fifth environmental program is advocating stronger protection of groundwater and a lower consumption of pesticides. It also comes at a time when the EU heads of state have auspiciously announced "that the major battles on behalf of the environment will be won or lost during the course of this decade."

The official Danish position is as clear as uncontaminated drinking water. More relaxed regulations will be a major setback.

But Danish scientists are posing the question whether healthwise it is even reasonable for Denmark to insist upon the principle of uncontaminated drinking water.

#### Critical Scientists

Associate Professor Erik Arvin of the Laboratory for Technical Hygiene at Denmark's Technical University is one of the critical voices:

"Pesticides in the microscopic quantities found in Danish groundwater are not harmful. However, Danish environmental policy in the groundwater issue is determined almost exclusively by what it is technically feasible to measure. The attitude is, if it can be measured, it's toxic.

"An ordinary halt in traffic causes the ingestion of 30 to 40 times the concentration of chlorinated solvent as is found in groundwater. And a public pool is a downright gas chamber viewed from this perspective," he said.

Veterinarian Bent Fenger, director of WHO's European Water and Sewage Office, dared to lay his head on the block when it came to the health and scientific threshold values the organization has established for chemicals in drinking water. Although the values are up to 1,000 times higher than the existing threshold values of 0.1 microgram (in principle, zero), he guaranteed them to be so safe that human health is not an issue as long as the values are not exceeded. This would hold true even if there were many different substances present in the water at the same time.

"The threshold values build upon a thorough scientific documentation of materials with built-in safety factors of up to 100,000," said Fenger.

#### Pesticides and Cancer

In some of the scientific investigations on pesticides under discussion, one may read that many of these substances are carcinogenic. This is true of a study published in 1992 by Dr. Flemming Lander, a Danish physician who studied occupational diseases.

Lander demonstrated a frequency of up to five times the average number of cancer cases among gardeners. That is, among people who have frequent contact with pesticides.

On the basis of his work with cancer patients and pesticides, Lander stated that, as far as health was concerned, it was playing the lottery to place threshold values on the pesticide content of drinking water.

His study, which included 4,000 gardeners, did not mention types or doses of the pesticides the gardeners had been exposed to. But an organization under WHO, the International Agency for Cancer Research (IARC), has recorded a number of pesticides that are potentially cancer causing. This includes, among others, five of the eight chemicals that DGU measured in treated water.

"We register chemicals that have the ability to cause cancer. But our records do not tell what doses are necessary to cause it," said biologist Henrik Moller from IARC in Lyon.

How much or how little of these substances must be present to cause cancer or other health problems has simply not been evaluated by Danish environment administrators. The idea that an evaluation of levels dangerous to health should supplant the guiding principle of zero contamination runs up against strong resistance from environmentalists.

Finn Bro Rasmussen, chairman of the EU's advisory Environmental Chemicals Committee, considered it absurd to place one's fate in the hands of science in so basic a question as groundwater.



And in the Danish Environmental Board, Gunver Bennekou, director of the Office of Preventive Means, agreed:

"You can perhaps run a risk with food or medicine. Because those substances can quickly be removed if we learn something new. But with groundwater it is a question of an ongoing process over many years. In other words, our knowledge is of no use if we find out that we set our threshold values too high," she said.

Anders Baekgaard, director of the Danish Purification Plant Association, said:

"We would have considerable difficulty explaining to our consumers that they can feel easy about drinking water with toxic residues or solvents in it. But it is also a bad idea to relax quality standards in an area, like water, that is an important pillar in the maintenance of life itself."

#### The People's Voice

The voice of the people is as yet very meek. The battle over drinking water has so far not appealed to popular movements to anything like the same degree as the question of nuclear power did, for example.

Danish environmental opinion on the subject has been virtually synonymous with agronomist Lone Albrektsen. She started the Greenpeace agricultural campaign. Ever since the organization shut down that aspect of its work, she has worked alone on her own to capture people's attention concerning the groundwater problem.

Her main point is that the threat to the groundwater cannot be eliminated unless agriculture is radically transformed into an extensive and ecological operation.

"If EU support to today's industrialized agriculture were to be given instead to ecological operations, ecological agriculture would pay for itself far better in the long run than conventional agriculture. At the same time, society would save the money for prevention of pollution that conventional agriculture generates. To slack off on environmental requirements for the sake of encouraging the current form of agriculture would be an unforgivable experiment with the health of our own and future generations," said Albrektsen.

**Economic Impact on New 'Green Taxes' Weighed**  
94WN0207A Copenhagen BERLINGSKE TIDENDE  
in Danish 17 Feb 94 p 5

[Article by Janni Andreassen: "Green Taxes Will Hit the Gluttons"]

[Text] Environment: Industry will get an increasing share of green taxes. Seen from an economic point of view, this is not a catastrophe, according to a lecturer in social economics.

Green taxes will change attitudes toward consumption and resources. It will be expensive to use unnecessary energy. Seen in another way, if Mr. and Mrs. Jensen absolutely must lie in a heated water bed, then they must pay more than the rest of us who remain on a mattress and slats.

With the government's tax reform of the summer of 1993 it will be the housekeepers who will notice the green taxes.

Now a committee across party lines is sitting to put the finishing touches on the details of a proposal in which it will be industry's turn to pay taxes that will provide an income of about 3 billion kroner over a period of a few years.

All industry has been against the tax, arguing that the medicine can be so strong that it knocks the patient for a loop.

"But seen from an economic point of view, green taxes are not a catastrophe for industry," Jesper Jespersen, a lecturer in social economics at Roskilde University Center, says.

"What industry can fear is that the government may rapidly introduce higher taxes without any form of repayment to industrial firms. This would create problems. Therefore I also think that the government's signal to industry should have been clearer so that everyone would understand that the introduction of green taxes is something that is coming but that at the same time requires a long-run strategy."

#### Green Success

Japan is the history of a green success. But it didn't look like this 20 years ago, when the country was about to choke in environmental problems. The energy crisis in the 1970's came to Japan's rescue. Instead of letting the gas-guzzler stay in the garage and riding a bicycle to the baker, the Japanese developed the technology for a small, environmentally friendly, compact car.

Today the Japanese have overcome their problems in resources and environment with very tough taxes. This has not meant any economic catastrophe. On the contrary, Japan has reduced its energy consumption to a third of that of the United States, which means that they are three times more energy efficient.

"In the Danish industrial cost picture, energy makes up today about 3 percent. Therefore, for example, a doubling of the price will not be an cost catastrophe."

"But industry must have the necessary time for the change so that in its investment plans it can take into account that energy has become more expensive, that to a greater extent than before more must be invested in energy-saving machines and in the necessary preparation for production."

"If in addition, political care is taken to connect the green proceeds to the development of resource and energy saving technologies, this will contribute to an increase in the rate of industrial change so that in reality businesses will not be particularly burdened economically. They will simply have some earlier costs that would have come anyway and that they would have had to pay just the same."

#### Question of Style

Will green taxes primarily be used to change attitudes and conduct?

"Green taxes are primarily environmentally regulating. They must not be used to fill up the national coffers. They are to hit marginal consumption—extreme consumption—both in industry and in housekeeping. And not, for example, like carbon dioxide emission, which is screwed together completely backwards. If you are a little pig in the environment, you must pay 50 kroner per ton in taxes. If you are a somewhat smaller pig, you only pay 25 kroner. And if you pig out in high style, you may have to pay according to the environmental provisions of industry."

"One does not get a better environment free."

"Today most of the environmental taxes are imposed upon total consumption." That is, we pay the same 50 ore in taxes for the first and the last kilowatt hour [kwh]."

"This is falling between two stools. The first kwh that is used in a company or in a house is a necessity. Without it, we cannot survive economically or physically. Therefore the tax on the first part of the consumption is not conduct-regulating, either. But at the other end it can become so, when you use kwh to warm up the water bed—or you don't close the chimney or replace the energy-consuming bulb with an energy-saving one in the factory."

"Fifty ore in tax for the last kwh does not push people much in a conduct-regulating direction. But it produces perhaps five kroner in five years."

"The important thing is to make people understand the saving percentages and green taxes in good time. In five years things will work fine. In a few years industry can adapt its activity either by lowering the temperature, rationalizing production, or by carrying out energy savings. The point is that it must be expensive not to save where it is possible to do so."

#### Repayment

Shall industry have a direct share in the repayment of profits from the green taxes?

"The ideal competitively would be to give the money back to the individual businesses. But some companies are more locked into their methods of production. Even if they get a part of the profit, it is not certain that they

will be able to use it to save energy. Therefore I would much prefer to give it back on a branch level, so that the firms that have the possibility of changing their production structure can have some of the money."

"In repaying on a branch level, there is always the danger of being cost-neutral, even if this is not completely correct, because the moneys originally came from the businesses themselves. But this must be seen in the light that one is getting a cleaner environment and possibly also products and production processes that will be more competitive when energy prices rise."

"It is a gamble. But one of the gambles that is less uncertain."

"Finally, there is an important difference in the way one measures the environmental effect. The choice is between administrative regulation and a market one. In their report of May of last year, the wise men concluded unanimously that it is up to seven times cheaper to use the economic instruments, because they can be adapted to the businesses that can most easily change their production structure."

"Whereas if one forces a uniform regulation onto all businesses, then one forces a costly task upon the ones that have difficulties in changing."

#### Danish Solitary Path

Is the Danish solitary path useful in the environmental area?

"As far as value growth and consumption possibilities are concerned, it does not make a lot of difference whether Denmark alone introduces the carbon dioxide tax or whether it is made into part of a larger common European action. This is also in the wise men's report. A coordinated effort will give a little minus in value growth of 0.3 percent, while an isolated Danish effort will give a minus of 0.4 percent."

"It would be a little harder on private consumption, where a coordinated effort leads to a fall of 0.3 percent, while an isolated Danish effort gives a minus of 1.0 percent."

"Where one considers that consumption is rising by 3 percent a year at the moment, it is only a third of one single year's consumption rise that we lose by going our own way."

"But this is not the impression one gets when one hears comments from industry and political organizations. They have simply not digested the results. This is too bad for the wise men, and it is too bad for the debate."

#### National Coffers

What do you think the finance minister means by conduct-regulating green taxes?

"Conduct-regulating taxes can lead to a cleaner environment and a less energy-dependent production and consumption. But it can also be done in a way that makes the finance minister happy."

"What there is a lot of, namely labor, will be made cheaper. And what there is little of, resources, will be made more expensive."

"There are not many wage taxes left in Denmark to regulate. But the gross tax and the earmarked labor market taxes are in reality the gearshift the finance minister can back up with."

"He can also use the gearshift to back up with the withholding tax by saying that the businesses that change their cost structures do not have to pay all the withheld amount of worker taxes if they in turn are willing to have resource consumption be taxed by a corresponding amount."

"And what's the trick? Well, the finance minister gets just as much money in his coffers. He eases the tax on the use of labor and increases it on the resource side."

"There may be businesses that will have difficulties in managing a change. Therefore such an arrangement can be done voluntarily at first."

"With the great unemployment we have, we must now work on the environmental sector. This is enough to work on."

## FINLAND

### Study Shows Decreased Heavy Metal Emissions

94WN0200A Helsinki *HELSINGIN SANOMAT*  
in Finnish 25 Feb 94 p 5

[Article by Tapio Mainio: "Forest Research Institute: Heavy Metal Emissions Into Environment Have Decreased; Volume of Cadmium Reduced by One-Fourth"]

[Text] According to the Forest Research Institute (METLA), less heavy metal than before is spreading into Finland's natural environment. According to the METLA report, the amount of toxic cadmium in moss samples has decreased by one-fourth over the past five years.

Cadmium and nickel emissions into the air have decreased because the fertilizer industry has changed its production methods.

According to an earlier Environment Ministry study, discharges into the ground increased during the late 1980's, but emissions into the air and water decreased.

Cadmium is one of the most toxic elements. As an environmental toxin, it accumulates in tissue, especially the kidneys and liver, and it may cause serious intoxication. Not all of cadmium's injurious effects are known.

### Most in Harjavalta and Kokkola

According to the METLA study, high cadmium content was still measured in the moss samples collected in Harjavalta and Kokkola. There were also increased concentrations in the environments of the biggest population centers in southern and southwestern Finland.

METLA studied heavy metal discharges in moss. In the study that was just completed, they compared the results obtained in 1985 with the moss samples collected in 1990. About 5,000 samples were collected from 3,009 different sites in Finland in the selected test area.

"I'm particularly pleased with the drop in cadmium and lead discharges since they spread easily to wide areas. For example, cadmium reaches Finland as remote fallout from Central Europe," Assistant Professor Eero Kubin of METLA said.

Cadmium gets into the environment from the fertilizer industry and from combustion gases produced by the burning of waste, among other sources. There is also a certain amount of cadmium in phosphate fertilizers and substances used for coating products.

There was over 0.5 microgram of cadmium per gram of moss sample in Kokkola and Harjavalta. Concentrations of as much as 2 micrograms per gram were found in moss in studies made in Poland, Romania, and Hungary.

According to the foreign substance statute, there may be up to 0.1-0.5 milligrams of cadmium per kilogram in foodstuffs.

"The order of magnitude is the same if the guideline figure is compared with the results of the moss studies, although moss is not eaten. It is, nevertheless, hard to say whether the Kokkola or Harjavalta discharges are affecting people's health," METLA chemist Harri Lippo said.

### Study To Be Repeated Next Year

"We get a good picture of heavy metal emissions in Finland and how they are changing with the aid of samples. Impurities in the atmosphere like heavy metals reach the ground along with rainwater. The metals accumulate in the tissues of the moss since they get their nourishment from rainwater," Lippo said.

The extensive moss study will be repeated next year. The study is part of an international follow-up study that was begun as a joint Nordic effort in 1985.

From the results it is apparent that the volume of lead, which is damaging to people and the environment, has decreased by one-third over the past five years. The switch to unleaded gasoline has done the most for reducing lead emissions.

The volume of vanadium in the environment has also decreased since the oil refineries have abandoned the use of heavy fuel oil and switched to natural gas.



Chromium, copper, iron, and zinc concentrations have remained at the same levels or increased slightly. Tornio's large chromium emissions have, however, decreased since the Outokumpu steel mill improved its cleaning equipment. Chromium is known to cause allergies.

**Forestry Industry Presents Environment Plan**  
*94WN0222A Helsinki HELSINGIN SANOMAT*  
*in Finnish 16 Mar 94 p 10*

[Article by Johanna Mannila: "Forest Industry Committee Wants To Put an End To Draining and Plowing of Forests by 1996"]

[Text] *The forest industry environment committee has unanimously proposed new laws and is demanding that nature conservation programs be implemented within seven years.*

The plowing and draining of forests and spraying of sapling thickets with pesticides will come to an end by the end of 1996 if the unanimous proposals in the forest industry's first environment program are implemented.

The recommendations are of great importance to the landscape of northern Finland because over half of the forest regeneration areas are being plowed. Machine contractors will be given two years to adapt to the situation.

The forest industry's environment program was delivered to Environment Minister Sirpa Pietikainen (Conservative) and Agriculture and Forestry Minister Martti Pura (Center Party) on Tuesday [15 March]. The program differs from the agriculture program in that the committee proposes changes in the laws for the forest industry, and it does not settle for recommendations.

According to the program, the diversification of commercial forests will be the most important task of forestry experts during the present decade.

The committee wants to call clear-cutting cultivation cutting. In the committee's opinion, it is unfair to compare Finland's few hectares of clear-cut forest with Canada and Russia's thousands of hectares of logged forest, especially since they are not worried about renewing their forests in those countries—by seeding and planting—as we are in Finland.

The committee proposes 10 hectares as the initial size of areas to be clear-cut; a clearing area could be as large as 15 hectares in Lapland. Clearings will not be completely stripped anymore; some of the trees are supposed to be left to grow old and decay.

**Order of Importance for Nature Conservation Programs**

In its program the committee also proposes that the forest law be revised and they demand that the current nature conservation programs be implemented within the next seven years. They lay particular emphasis on

protection of the program for the conservation of old forests and of threatened species.

"The purpose of the program is to change the forest industry such that, in addition to timber production, the industry also sees to the care of all of the forest wildlife and the maintenance of biodiversity," the chairman of the committee, general manager Juhani Viitala, emphasized.

The program teaches Finns a new expression, key biotope.

Groves, lush woodland, stream banks, shoreline, island, and hardwood forests, among others, are ecologically important key biotopes. The program lays emphasis on special care for them and their importance to commercial forests.

In the committee's opinion, we ought to take a critical view of the purchasing of forestland in connection with conservation. "We don't have to buy up everything. We're considering exchanges of land, nature conservation bonds, shares in state companies, and use restrictions as alternatives instead of redemption," Viitala said.

On behalf of the health of the forests, they propose in the program that logging be increased.

Finland's forest growth comes to 85-88 cubic meters, 3 million of which are in protected areas. "We estimate that compliance with this program would exclude 5 to 10 million cubic meters from logging. Since 55 million cubic meters are logged in normal years, implementation of the environment program will not jeopardize the forest industry's growing need for timber either."

**Forest Boards Would be Responsible for Monitoring**

Locally, forest boards would be responsible for the diversity of forest wildlife and its development. The forest boards would work in cooperation with environment officials.

Monitoring the care of the environment would be entrusted to the forest boards. Since difficulties that have arisen in implementing conservation programs have negatively affected relations with landowners, the committee proposes that forest care associations serve as intermediaries in sales of woodpecker forests.

"Landowners would get information on conservation programs from representatives of forest care associations, with whom they are used to doing business anyway. This is assuming that environment officials inform the forest organizations on the biological principles conservation is based on and provide them with information on financing and alternative courses of action," Viitala said.

Implementation of the environment program would cost the government 260 million markkaa a year.

**Proposals for New Forest Laws**

**Law for the permanent use of forests:** Finland's first general law governing forests. The drafting of the law has already begun and it is supposed to go into effect in 1995. The law would apply to all forests owned by owner-group associations, the state, and corporations.

**Private forest law:** The promotion of forest wildlife diversity would be specified as the goal of forest care. To go into effect in 1996.

**Laws on forest centers and association forests as well as forest care associations:** Forest organizations' obligation to promote the diversity of forest wildlife would be written into the laws. The organizations would be responsible for furthering care of the environment in connection with practical forest management and for monitoring them in cooperation with environment officials. To go into effect in 1996.

**Forest damage prevention law:** Those who gather wood in the summer would be obligated to avoid turning over roots, which decays spruce thickets. Forest contractors would have to pay forest owners compensation for any damage they cause while harvesting trees starting with 1996. The committee wants to ban excessive cleaning up of forests so that some decaying trees will be left in forests.

**National Policy**

The environment program for the forest economy was drafted within six months, faster than anyone would have thought possible. International agreements signed by Finland and the forest industry's ability to compete on markets in which emphasis is laid on sound ecological practice are behind the Agriculture Ministry's speedy action.

Diversity must be included in ministry programs and laws since Finland committed itself to promoting diversity in its forests at the environment conference in Rio and at the conference of forestry ministers in Helsinki.

Committee chairman Juhani Viitala hoped that the program would receive some measure of official support from the government. It will be easier for us Finns to demand that others make changes in the ways they exploit their forests if our own laws and guidelines are in order.

On the committee were representatives of, among others, the forest industry, the National Board of Forestry, Tapio, the MTK [Forest Industry Association], the National Boards of Waters and Environment, and the Nature Conservation League. Ten of the 12 members of the committee were foresters.

In addition to official Nature Conservation League member Esko Joutsamo, the committee also heard a great deal from Nature League, World Wildlife Foundation (WWF), and Greenpeace activists at different points of their deliberations.

The committee's unanimous proposal will now go through a rapid round of circulation for comment. The Environment Ministry's forest conservation strategy, which concentrates on protected areas and restoration problems, among others, instead of commercial forests, will be presented next week.

**Environmental Cooperation With Russia  
Unsuccessful**

*LD1404220794 Helsinki Suomen Yleisradio Network  
in Finnish 1430 GMT 14 Apr 94*

[Excerpts] Environmental investments beyond Finland's borders have proved effective, says the Foreign Policy Institute in a report. Environmental cooperation with Estonia and Karelia has advanced well, but has been badly limping with Russia. Jaana Kanninen reports:

**Kanninen:** Finland has pursued environmental cooperation as part of its foreign policy for three years. There have been joint projects with four separate regions, Estonia, St. Petersburg, Karelia, and Kola. It became clear during these years that it is easier for a small unit to work with another small unit. The projects in Estonia and Karelia have got off the ground well.

**Begin unidentified voice recording:** The problem areas are the Murmansk area, St. Petersburg, and the Leningrad region where the scale is large. If one looks at this problem of scale, Finland's possibility of having more effective input in environmental cooperation in this region lies in seeking international cooperation partners, thereby sharing the burden. For instance, if we join the European Union, one central possibility is to direct the European Union's environment policies into these areas and that way acquire more resources. [end recording]

**Kanninen:** Tapani Vaahtoranta, director of the Foreign Policy Institute, says that there are other reasons too for the failure in Russia. The Russians have criticized the Finns for being too selfish. According to them, the Finns want, above all, to boost their exports of environmental technology. Surprise has also been expressed that the Finns want to support what locals regard as secondary issues. Why is it so important to clean St. Petersburg's effluent when the inhabitants in the region do not even have proper drinking water, people have asked.

One problem is that, with the exception of the Republic of Karelia, Russia's decisions are still made in Moscow, far from the problems. The Foreign Policy Institute suggests that Finland could start supporting local citizens' organizations. [passage omitted]

The effluent purification plant in Tallinn is the most advanced of the cooperation projects. The renovation of the power stations in Narva and the installation of desulphurization equipment in Kostamus are also in the construction stage. In the past three years, FM [Finnish markka] 110 million of Finnish money has been spent on

near-area cooperation, a sum which it has been worthwhile spending beyond the border, even for selfish reasons, says director Tapani Vaahtoranta. [passage omitted]

## FRANCE

### Anti-Superphenix March To Reach Paris 8 May BR1204143894 Paris LE MONDE in French 10-11 Apr 94 p 22

[Michel Castaing report: "Demonstration Against Superphenix Intended To Rouse Antinuclear Movement"]

[Text] The protest march to be held from 9 April to 8 May by the "Europeans Against Superphenix" ecologist group, going from Creys-Malville in the Isere region of France to the prime minister's residence in Paris, is intended to reawaken the antinuclear movement in the light of the upcoming national debate on energy and June's European elections.

After years of tranquillity, the hamlet of Faverges, in the north of the Isere region, was peacefully invaded on the morning of Saturday 9 April by the first participants—some 1,000 people—in the antinuclear march organized by the Europeans group Against the Superphenix nuclear reactor. [Footnote 1] [The coordinating group of the Europeans consists of six organizations: the Malville committee (Lyons), the FRAPNA (Rhone-Alpes Federation for the Protection of Nature), Greenpeace-France, the GSIEN (Group of Scientists for Information on Nuclear Energy), and the World Wildlife Fund, from Milan. The Europeans includes some 300 associations or groups, including political parties (the Greens, Generation Ecology, the Greens in the European Parliament, and Red and Green Alternative), and several dozen foreign associations, predominantly German and Swiss.]

Faverges had doubtless seen nothing like this since that dramatic Sunday 31 July 1977 when a major antinuclear rally (over 20,000 demonstrators) degenerated into violent clashes with the police, leading to the death of a 30-year old pacifist schoolteacher, Vital Michalon who was killed by a grenade. Before the departure for Creys-Malville, the site of the fast breeder reactor which was ringed by police, and Moestel, the stages on this first day, a commemorative plaque was unveiled to his memory.

This march, which will take the ecologists to the Paris science and technology park before moving on to the prime minister's office on 8 May, heralds the awakening of an antinuclear movement which has lost much of its sting in recent years, in particular in the area around the Superphenix. The local reasons for this are twofold: first, the fast breeder reactor has been shut down since 2 July 1990, and concerns have thus been lulled; secondly, maintenance operations have created some 2,500 jobs.

Previously openly opposed to Superphenix, the mayor of a small neighboring town expressed an opinion widely

shared in the region: "We all have relations working in the power station, so now is not the time to be picky, even though I am still aware of the specific risks posed by the reactor."

It was the government's decision, made on 22 February, to use Superphenix not as a nuclear power station but as a "reactor dedicated to research and experimentation," that jarred its opponents back to life. The Europeans Against Superphenix reiterated that "it was during safety experiments that Soviet engineers caused the worst accident in nuclear history." Throughout the journey the caravan of protesters will hammer out a slogan worthy of [French satirist and comedian] Coluche: "If you laughed at Chernobyl, you mustn't miss Creys-Malville!"

### Highly-Symbolic Stop-Off Points

"Pull the plug on Superphenix!" declares the 15-meter long banner leading the procession out of Faverges, indicating that the protest is focused firmly on the only industrial-scale fast breeder reactor in the world and that the ecologists do not intend getting way-laid by more general issues.

The whole range of arguments against the use, in whatever form, of the Creys-Malville plant is used, including its high cost: "In 20 years, this reactor has already cost over 50 million francs [Fr], has only operated for 176 days and still wastes Fr600 million a year," and the risk it poses: "Superphenix still contains 5 tonnes of plutonium and 5,000 tonnes of sodium." [footnote 2] [Superphenix cost Fr27.7 billion in today's money to build, Fr7.65 billion of which in interim interest. Maintenance costs Fr650 million per year (Fr750-800 million in 1993). To completely abandon it would cost Fr12bn, to which can be added Fr18 billion in compensation for France's partners. The station operated for 7,400 hours (slightly more than 300 days) since being hooked up to the EDF grid in 1986. Fuels used total 5.5 tonnes of plutonium, while 3,500 tonnes of the 5,000 tonnes of sodium are still contained inside the reactor tank.] Encouraged by a precedent—three days before the scheduled restart date of 2 July 1992, the then-Prime Minister Pierre Berégovoy froze any decision—and guessing that the Balladur government will not make any further decisions on restarting the reactor before the European elections in June, the anti-Phenix movement intends putting this period to the best use by exerting as much pressure as possible. All the more so, of course, since the national energy debate opens at the start of May.

The fliers that are to be distributed from Faverges to Paris state: "We must put a stop to this costly, dangerous, and useless experiment... Errare humanum est, perserverare diabolicum [to err is human but to persevere is diabolical]." Abandoning the reactor would be considered "a brave and positive act." The antinuclear lobby has also broken away from the radical attitudes of the past, at least in appearance.



In this way, the Europeans Against Superphenix are thus again out campaigning for support. Greenpeace-France hoped that "the march can trigger a chain reaction along its route, mobilizing sectors of public opinion reaching far beyond traditional ecologist groups. Everyone understands that, behind Superphenix there is the need for a greater transparency in the debate on energy choices in France."

This is why highly-symbolic stop-off points have been chosen, such as the Lyons headquarters of the NERSA, the Superphenix operating company; the power stations at Fessenheim (Haut Rhin), Cattenom (Moselle) and, on 26 April (eight years to the day since the Chernobyl disaster), the station at Nogent-sur-Seine; the European Parliament in Strasbourg, etc. The march will also pass along some Swiss towns (Geneva, Lausanne, and Basle), and, the organizers insist, it will also visit a number of "alternative sites" promoting renewable energy sources. The caravan will also be running a campaign of post-cards addressed to the prime minister.

## GERMANY

### Reclamation of Contaminated Soil Extremely Expensive

BR1304144994 Bonn DIE WELT in German 28 Feb 94 p 11

[Article by Frank Elsner: "How Much Ecological Recovery Can There Be in Wismut?—Environment Experts Say GDR (German Democratic Republic) Uranium Mining's Legacy of Contamination Will Cost Much More Than 15 Billion German Marks (DM)"]

[Text] In the GDR it was a country within a state with its own police and jurisdiction, closely watched by the Soviet secret service; the mining area of the "Soviet-German Wismut Corporation." Over a period of 40 years the USSR [Union of Soviet Socialist Republics] took some 220,000 tons of uranium—the raw material for its military and civilian nuclear programs—from the ore deposits of southern Saxony and Thuringia. Its legacy is Germany's biggest ecological disaster. Environment experts fear that decontaminating it properly will cost far more than the DM13 to DM15 billion officially estimated.

Those who gained from the wasteful exploitation of nature and human beings will not pay the price of it. Bonn inherited the GDR's half of Wismut anyway, and in May 1991 the USSR handed its half over as well—and with it all responsibility for more than 3,000 radioactive waste heaps, 300 shafts and mines and a large number of sludge lagoons containing uranium and radioactive decay products.

The bomb must be defused by the successor company Wismut GmbH. The resources—about DM700 to 800 million a year—will be provided by its sole shareholder,

the Federal Ministry of Trade and Industry. Chief executive, Manfred Bergmann, estimates that the ecological repair work will take 10 to 15 years. Then it will be possible to "build kindergardens again" on the contaminated areas. Trade and Industry Minister Rexrodt explains that the "Wismut project" meets "international standards."

Environment experts think otherwise. Munich radiation biologist Edmund Lengfelder says that the GDR's lax radiological protection rules have been perpetuated in the Reunification Treaty for what was once the world's third largest uranium mining area, in particular. According to Gerhard Schmidt of the Darmstadt-based Ecological Institute, the lack of statutory rehabilitation targets such as are standard in the USA is painfully obvious. "Wismut has no measuring stick for its work."

Whether Wismut has the technology to keep the environmental hazards permanently under control is also a matter of controversy. Lengfelder disputes in particular that the radioactive sludge lagoons are securely sealed—a great hazard for the groundwater. "Perfect reclamation" could easily breach the DM100 billion cost limit, the radiation biologist believes: "Bonn must know what quality it wants. It is a political matter."

Worse than that: After thoroughly plundering the uranium stocks, in 1962 Wismut gave all the worthless mining areas back to the respective local authorities. These are now getting not a penny from the pot in Bonn.

### Image of PVC Improved by Recycling

94wn0210b Duesseldorf VDI NACHRICHTEN No 11, 18 Feb 94 p 17

[Article by Hans Dieter Sauer: "Recycling Improves PVC's Image"]

[Text] [First paragraph is editor's summary] VDIN, Duesseldorf, 18 Feb 94 (Curse or blessing) no artificial material is a source of such vehement discussion as polyvinyl chloride. The economy has built up a comprehensive infrastructure for recycling and is thus removing a portion of PVC from critical environmental discussion. PVC is everywhere. It is found as window frame, drainpipe, floor covering, cable sheathing and automobile part, but also as transparent wrap, record, check-cashing card and ring binder. Every year the chemical and plastic processing industries put 1.4 million tons of new PVC in circulation, and approximately 360,000 tons are discarded annually as used products. Producers and processors of PVC praise its resistance, durability, and versatile applicability. Environmentalists, on the other hand, see it as particularly environmentally harmful material: during production the carcinogenic gas vinyl chloride is employed, and PVC also contains toxic materials as softeners, as well as lead and cadmium for UV stabilization. Not least, burning the artificial material can create dioxins and fusanes. The great majority of old PVC is still deposited as trash or burned. But the material is more and more often becoming part of a

cycle. Werner Preusker, chief executive of the Bonn working group PVC and Environment (AgPU), a coalition of PVC producers, processors and users, private individuals and institutes, emphasizes: "There are functioning recycling possibilities today for the most important PVC products."

For windows, floor coverings, pipes and gutters (quantitatively these products make up half of all PVC products) the organization of comprehensive collection systems is in full swing in Germany or has already been completed. The first major plants for reprocessing the used material have started up. Six manufacturers of PVC windows have joined forces in the "Window Recycling Initiative" (FREI), which has reached agreement with numerous window and facade companies about returning used windows. FREI members in turn have committed themselves to using recycled PVC products in the production of new window profiles. The windows are taken for reprocessing to Dekura GmbH in Rahden, in Westphalia. As a rule the recycled material is processed into a profile nucleus which is surrounded by a layer of new material.

Reprocessing is done basically in three steps. After rough shredding and the sorting out of glass splinters, a shredder chops up the frame pieces along with fittings and steel frames. Then magnets and separators separate iron and nonferrous metals out of the mixture, and a so-called heavy goods selector picks out any fragments of glass and metal which remain. The material is then ground into small grains, sifted, extruded at 150 degrees Celsius and finally granulated in pill size. The plant can process 1.5 tons of used windows in an hour. At present it is running a single shift—not enough material is being supplied for more.

Because numerous depositories still accept used windows, according to Dekura's chief executive Horst Detering, "recycling is having the ground cut away under it." Besides FREI, the profile producer VEKA in Sendenhorst also takes back old PVC windows. In the Thuringian town of Behringen, north of Eisenach, VEKA Environmental Technology GmbH has constructed for about DM30 million the "most modern recycling plant in Europe for windows, roller blinds, plates and profile remnants made of PVC." The fully automated plant also uses their different physical properties to separate the window components into glass, metal, rubber and PVC.

According to the operators, 97.5 percent of the material provided can be recovered in reusable quality; only 2.5 percent is unusable waste. Production leader Erich Schulz emphasizes as a particular advantage that soon it will be possible to sort the recycled product into white and colored. For this purpose every grain of PVC is subjected to a flash of light; if it is a white grain, a puff of air from a jet is released by its greater reflectivity and the grain is blown off the conveyor belt, while the colored grains are unaffected and stay where they are. The plant can also reprocess the wooden windows with plastic coating typical of the GDR, so-called *plasta* windows.

Since the wood is untreated, according to Schulz it is suitable for the manufacture of chip boards. To ensure supplies, VEKA has made agreements with 300 processors of PVC frames to supply dismantled windows, roller blinds and profiles in Behringen.

Floor coverings have been collected since 1990 by the working group PVC Bodenbelag Recycling (AgPR) in selected test areas and processed in a plant in Grossefehn in East Frisia. However, it took some time to master the technology. "We needed to find out that you have to proceed quite differently in the reprocessing of used coverings than in the reuse of production residue," reports Hans Juergen Nettelbreker of the company Huel AG, which developed the procedure for AgPR. The solution they found was so-called cold grinding. The soft PVC is hardened by liquid nitrogen so that it can be reduced to very fine grains with a diameter of 200 micrometers.

In this way not only is the quality of the grind improved but a significantly higher throughput is also achieved. The plant's present capacity is 4,000 tons per year according to Nettelbreker, more is not available at the moment on the used PVC market. The recycled material is reused by the member companies of AgPR as an underlay for floor tiles.

After being dismantled last autumn, the plant is now being rebuilt in a more favorable location in Troisdorf near Bonn. A plant is being planned at the same location for the recycling of PVC roof guttering.

PVC tubes are collected under the guidance of the Artificial Materials Association (KRV) in Bobb. From the dealers the material goes to four regional centers, where it is sorted and cleaned. The processing is scheduled to begin soon on the premises of the Wavin company in Westeregeln near Magdeburg. A total of approximately 5 percent of PVC waste is now being recycled, in the estimation of Walter Toetsch of the company Huel AG.

In the case of pipes and windows, because of their long life, at present there are only minimal quantities of less than one percent. In the case of floor coverings, approximately 20 percent is reprocessed. Recycling stands or falls with the collection system. The purity of the various types and the soiling of the material, and thus ultimately also the quality of the recycled product, are determined by the method of collecting.

Since different PVC types are used for different products, the basic rule is: window profiles are made into window profiles, floor coverings are made into floor coverings, and pipes are made into pipes. When collection is carried out by professionals, good results are achieved.

Experience has proved, however, that collection in unsupervised containers yields unusable mixtures even when the user is given extensive information. In any case, collection is associated with high costs. That is why

recycled products are usually more expensive than raw materials. Toetsch confirms that "the recycling of artificial materials, apart from production wastes, must always be subsidized through the product or through a disposal fee." At Huels AG, PVC was ground nine times to technical school standards and reformed into products without its mechanical properties deteriorating. But practical recyclability is limited by the structure of the finished products, demands placed on the material during use, and the type of collection.

In order to exploit the potential of nine cycles, more than 90 percent of every product generation would have to be recovered and cleanly sorted. "That is unrealistic," Toetsch points out. Even copper, he said, achieves a recycling quota of only 40 percent, which represents 1.7 cycles. Material recycling has its limits for PVC too. Depending on the application, a realistic proportion of recycled material in new products lies between 20 and 30 percent. This gives the upper limit for material processing, as is stressed by AgPU expert Joachim Eckstein.

If high reprocessing quotas were demanded, Eckstein calculates that there would unavoidably be large surpluses of recycled material. In his estimation the EU could accumulate a mountain of 50 million tons of used plastics over a period of 10 years. He is firmly convinced that "a return quota of 60 percent with nothing but material recycling cannot possibly be realized." The Federal Environmental Agency (UBA) in Berlin has not yet taken up an unambiguous position on PVC recycling. It describes its own attitude as "ambivalent"; it is true that recycling reduces wastes, but it does not solve the problems which lie in the material PVC itself. The UBA hopes for clarification from a research project with the title "Ecological Comparison of Products Which Contain Bromides and Chlorides With Those Which Do Not in the Construction Industry." The results should be available by the end of this year.

## ITALY

### Vegetable Diesel Oil Used for Vehicles, Heating Systems

BR1404102194 Milan *ITALIA OGGI* in Italian  
8 Mar 94 p 24

[Article by Edoardo Cagnazzi: "Vegetable Diesel Oil, Biopalma, Is Here"]

[Text] Naples—Clean, sulfur-free fuel that is extracted entirely from plants and is made of soya, rape, and sunflower oil. For the time being this is almost a pioneer initiative but it opens up a new frontier in the production of a vegetable diesel oil, which is an alternative to diesel oil, and also with a more acceptable performance in terms of heating and urban pollution. The sophisticated technology for the production of Biopalma, which is the name under which the diesel oil produced from vegetable oils will be marketed, is a project of the Palma distillery. A company that is part of the Neopolitan

agroindustrial and biochemical Palma company with annual revenues of 550 billion lire. Its holding company, Palfin, controls four sectors of activity. Distillation, with plants in Campania (Palma company), Puglia (Trani), and Sicily (Vinum Marsala and Trapas Trapani). The plants of Bari Palolio and Palvino operate in the oil sector; Chirico and Campano in the food sector. Finally the sole biotechnology plant is located in Calitri.

The fuel, say its producers, will revolutionize the fuel market within the coming years because it does not contain sulfur, the major cause of acid rain. This fuel was inserted in the Ruffolo- Conte decree two years ago to prevent pollution in urban areas and is currently being tested by several transport companies (AIM and Vicenza, AMT Trieste, ACAP Padua, ATM Milan, SEPSA Naples, and others). Since Biopalma is obtained from renewable sources it does not impoverish natural resources and drastically reduces polluting emissions from

### Fiat Recycles Plastic Automobile Residues

BR1504114194 Milan *IL SOLE-24 ORE* in Italian  
29 Mar 94 p 9

[Article by Jacopo Giliberto: "Combustible Gas From Plastic Residues"]

[Text] We know that old automobiles have always been recycled as much as possible. The steel that is used for the automobile chassis and the mechanical parts, amounting to 70 percent of the vehicle's weight, is melted down and reused.

Together with a pool of specialized companies and car wreckers belonging to the ADA (Car Wreckers Association), Fiat has launched the FARE (Fiat Auto Recycling Program) to recycle other components that generally end up in refuse sites: glass (car lights, windows, windshields), upholstery, principal plastic materials.

However, something always remains at the end of the Fiat cycle. It is the so-called fluff: various plastic fragments, pieces of upholstery, rubber strips, tires, and so on.

To date this material has only gone to refuse sites, since the presence of such varied components has made combustion in traditional incinerators a difficult problem. In addition the fumes are generally very "dirty" and purification calls for costly equipment.

In order to recycle this material the Montello Steelworks (of Bergamo) have taken part in the FARE project to test an innovative system of energy recovery that is based on the principle of pyrolysis.

The process has been developed in conjunction with the Smogless company of Milan.

A semi-industrial plant called SMIR is already at an advanced stage of testing. Here the fluff is transformed into combustible gases that are useful in improving steel



fusion and thereby result in energy savings. All this is achieved with very limited emissions.

The material undergoes a first separation stage: the finest part "which is generally very rich in inert gases," they explain at Montello, is eliminated. Then the real two-stage process begins.

The first stage is the transformation of fluff into gas and vapor at 600 degrees Centigrade.

The material is then fluidized by premixing with ferrous waste, which comes out at 500 degrees Centigrade: the iron is then introduced into the electric kilns at this temperature, so as to reach "a considerable saving in electrical energy because of the fusion," the steelworks affirm.

The vapors thus generated are sent to a second plant that was constructed with the experience of Smogless.

It is a grinding furnace in which an electric arc with carbon electrodes (which also generates thermoelectric and photochemical reactions) brings the gases to a temperature of 1,000 degrees Centigrade in an ionized and reducing environment.

A bed of incandescent coke, crossed by a difference in electric potential, exhorts the reactions.

In this way all the most dangerous composites, such as dioxins and furans due to the presence of chlorine (which is contained in PVC for example) are eliminated from the gases.

"Since the energy required to increase the temperature is supplied by electric energy and photochemical reactions," explain the Montello technicians, "the introduction of supporting combustion or air is not necessary."

The result is an extremely low content of carbon dioxide and nitrogen, thereby increasing the heating power of the gas that is produced.

In addition the vapor molecules are broken up and transformed into elementary components: carbon monoxide, hydrogen, and methane while the presence of chlorine and sulfur forms simple residues such as muriatic acid and hydrogen sulfide. These are eliminated with an alkaline solution purification, since the absence of carbon dioxide gives extremely high efficiency at limited costs.

The vapor obtained from this plant is a technological gas that Montello uses in the steel billet heating ovens.

## NORWAY

### Godal on Kola Peninsula, Arctic Region Nuclear Safety

PM1404115894 Oslo AFTENPOSTEN in Norwegian  
9 Apr 94 p 3

[Ole Mathismoen report: "Norway Cannot Give Much Help to the Kola Peninsula"]

[Text] Russia cannot afford nuclear safety in the northern regions. And Norway cannot afford to give very much help.

This was Foreign Minister Bjorn Tore Godal's conclusion yesterday when he yesterday put before the Storting a report on nuclear safety and chemical weapons in the regions close to northern Norway.

The Cold War has been succeeded by major environmental challenges. In areas very close to Norway there are enormous temporary dumps of nuclear waste, several dozen abandoned nuclear submarines, an old and unsafe nuclear power station, and large quantities of nuclear arms.

"It goes without saying that Russia has an independent responsibility for safety at nuclear installations and for solving the problems of waste. But neither Russia nor the other states of Eastern Europe are able to give this the highest priority. Such enormous resources are needed to sort all this out that the only possibility is broad international cooperation," the foreign minister said. He mentioned NATO, the EU [European Union], the European Bank for Reconstruction and Development, and the North Atlantic Cooperation Council as possible forums for such cooperation.

The foreign minister stressed strongly that Norway can only be involved in a small way in paying the bill for the biggest nuclear cleanup operation ever. Hitherto Norway has spent only 36 million kroner in aid for the EAst. In the past it has been estimated that it will cost somewhere in the order of \$150 billion to clean up the nuclear chaos on the Kola Peninsula.

"But Norway is assuming a lobbying role to get nuclear safety in northwestern Russia onto the international agenda," Godal said. But who will actually pay the bill, he was asked. "Russia and Europe's taxpayers will have to foot the bill," he said.

Asked whether Norway has plans for further short-term assistance for the Kola region in the absence of a larger-scale international aid operation, he replied: "We are keeping the situation under constant observation, but we have no plans for measures at present. These are sensitive issues on which we naturally want to work closely with the Russian authorities."

In the course of last winter there were several minor accidents at the nuclear power station on the Kola Peninsula, further nuclear submarines were mothballed,

and the situation regarding several of the temporary waste dumps—such as the dump ship Lepse, for example—deteriorated dramatically. In the light of this the foreign minister was asked if Finnmark is today facing a real nuclear threat:

"The potential dangers are considerable. But the situation is not acute," Bjorn Tore Godal said.

Yesterday the foreign minister was able to announce that the Russian authorities with the foreign minister at their head have given permission for a third Norwegian-Russian research expedition to former nuclear waste

dumping sites in the Kara Sea. Now the way is clear for an expedition to the formerly forbidden Ambrosimov Bay on Novaya Zemlya where there is reason to believe that considerable quantities of solid nuclear waste has been dumped.

The foreign minister's report to the Storting is the first public document on nuclear safety in the Kola region. Hitherto it has been the Bellona Environmental Foundation which, since the fall of the Iron Curtain, has constantly been digging up new information about the piles of radioactive waste the Cold War is leaving behind in the northern regions.

### France, Chile Propose Controls on Antarctic Visitors

OW1204090694 Tokyo KYODO in English 0745 GMT  
12 Apr 94

[Text] Kyoto, April 12 KYODO—France and Chile have jointly proposed tough regulations on tourists to Antarctica after reports of environmental damage caused by visitors to the frigid continent, sources at the Antarctica conference here said Tuesday [12 April].

Signatories of an international treaty on the Antarctic are meeting here at the Kyoto International Conference Hall until April 22 to discuss policies to protect the environment at the South Pole.

The proposed regulations would hold the tourists, their travel agents, and their countries responsible for protecting the environment, the sources said.

Tourists, who have been growing in number in recent years, and their travel agents would be required to submit a detailed plan of their visit 15 months before departure and strictly observe the environmental protection agreement during their trip, the sources said.

Home countries of the tourists and agents would be asked to approve the visits to Antarctica and in the event of violations of the protection agreement would be denied approval for visits up to five years, the sources said.

The United States and Britain, on the other hand, plan to propose guidelines for the tourists and adventurers, and are opposed to the strictness of the joint proposal of France and Chile.

Between 2,000 and 3,000 tourists visit Antarctica each year, but there have been reports of the tourists trampling penguin nesting grounds, damaging local plant life and disrupting scientific experiments being conducted in the area.

### Baltic Environment Group Sets Cleanup Agenda

94WN0219A Helsinki HUFVUDSTADSBLADET  
in Swedish 12 Mar 94 p 8

[Article by Katarina Koivisto: "Condition of Baltic Sea Improving Steadily"]

[Text] The condition of the Baltic Sea is improving, and discharges of heavy metals and so on have declined. From the list of so-called hot spots—particularly critical sources of effluent—drawn up by the Helsinki Commission for Protection of the Baltic Sea (Helcom) a couple of years ago, 13 such spots have already been deleted. Hopes are good that it will be possible to eliminate more hot spots over the next few years, says Helcom, which concluded its meeting in Helsinki on Friday [11 March].

The 13 critical sources of effluent that have already succeeded in reducing their discharges to a considerably lower level are in Finland and Sweden but also in Latvia

and Lithuania, which have been able in particular to reduce their discharges of polluted municipal refuse. Latvia is not a member of Helcom, but will join within a few months.

The Finnish hot spots are mainly industrial, and all factories are working to reduce their effluent levels. The two factories removed from the critical list at the end of last year were Kaukas in Lappeenranta and Enso-Gutzeit in Kaukopaa. Since that time, Metsa-Botnia in Kasko has also been removed from the list. Two of the hot spots that Finland is having the most trouble doing anything about are sewage from the municipalities in the region of the capital and fish breeding in the archipelago waters.

At its meeting, Helcom adopted a recommendation concerning the reduction of polluting effluent from the fish farms.

### Money Available

When Helcom designated the hot spots around the Baltic Sea, it estimated that cleaning them up would cost a total of 10 billion ECU's or about 63 billion markkas. About one-fourth of that amount has already been allocated to various projects, according to Fleming Otzen, Helcom's general secretary.

"We now know what needs to be done at most of the critical spots, and new measures are being adopted all the time," says Otzen. There are still nearly 120 hot spots in the Baltic Sea area, most of them in countries that belonged to the former Eastern bloc.

The situation in the Baltic Sea has also improved because many East European states have been forced to shut down factories due to the lack of money and raw materials with which to keep them operating. The lack of money has also led to a decline in the use of artificial fertilizer by agriculture. According to Otzen, Helcom now has a good opportunity to introduce better technology in factories of that kind before they begin operating again.

### Investment in Protection of Environment

Also adopted at the meeting in Helsinki were three recommendations concerned solely with protection of the environment. The first of those recommendations deals with the 100- to 300-meter restricted zone that will prevent construction on the shores of the Baltic Sea. Finland has accepted that recommendation, but with the reservation that construction with a special permit and construction in planned areas will be allowed.

A recommendation regarding a network of nature reserves was also adopted at the meeting. That network will consist of 62 different areas in the Baltic states, and it corresponds almost completely to the national nature reserves already in existence. But now that Helcom has adopted this recommendation, an individual nation will not be able to abolish a nature reserve without Helcom's approval.



The third recommendation dealing directly with protection of the environment calls for drawing up a so-called red book of threatened marine biotypes—that is, natural areas and species—in the Baltic Sea area. An initial survey will be conducted in each individual country.

The issue of chemical weapons being dumped into the Baltic Sea was also discussed at the meeting. Earlier reports to Helcom listed the known locations where dumping has occurred, but information on possible

Soviet-era dumping in Russian and Baltic territorial waters is still lacking. In any case, it is safer to let the chemical weapons stay where they are than to try to bring them to the surface, says Otzen.

"Fishing in the Baltic Sea area is so active that we now have a very good picture of where chemical dumping has taken place," says Otzen. "This means that we are not necessarily going to find any more old Soviet weapons."

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